

# HUMAN TELOMERASE

ATGCCGCGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAG	60
MetProArgAlaProArgCysArgAlaValArgSerLeuLeuArgSerHisTyrArgGlu	20
GTGCTGCCGCTGGCCACGTTCGTGCGGCGCCTGGGGCCCCAGGGCTGGCGGCTGGTGCAG	120
ValLeuProLeuAlaThrPheValArgArgLeuGlyProGlnGlyTrpArgLeuValGln	40
CGCGGGGACCCGGCGGCTTCCGCGCGCTGGTGGCCCAGTGCCTGGTGTGCGTGCCCTGG	180
ArgGlyAspProAlaAlaPheArgAlaLeuValAlaGlnCysLeuValCysValProTrp	60
GACGCACGGCCGCCCCCGCCGCCCTCCTTCCGCCAGGTGTCCTGCCTGAAGGAGCTG	240
AspAlaArgProProProAlaAlaProSerPheArgGlnValSerCysLeuLysGluLeu	80
GTGGCCCGAGTGCTGCAGAGGCTGTGCGAGCGCGCGCGAAGAACGTGCTGGCCTTCGGC	300
ValAlaArgValLeuGlnArgLeuCysGluArgGlyAlaLysAsnValLeuAlaPheGly	100
TTGCGCTGCTGGACGGGGCCCGCGGGGGCCCCCGAGGCCTTCACCACCAGCGTGCGC	360
PheAlaLeuLeuAspGlyAlaArgGlyGlyProProGluAlaPheThrThrSerValArg	120
AGCTACCTGCCCAACACGGTGACCGACGCACTGCGGGGGAGCGGGGCGTGGGGGCTGCTG	420
SerTyrLeuProAsnThrValThrAspAlaLeuArgGlySerGlyAlaTrpGlyLeuLeu	140
TTGCGCCGCGTGGGCGACGACGTGCTGGTTACCTGCTGGCAGCTGCGCGCTCTTTGTG	480
LeuArgArgValGlyAspAspValLeuValHisLeuLeuAlaArgCysAlaLeuPheVal	160
CTGGTGGCTCCCAGCTGCGCCTACCAGGTGTGCGGGCCGCGCTGTACCAGCTCGGCGCT	540
LeuValAlaProSerCysAlaTyrGlnValCysGlyProProLeuTyrGlnLeuGlyAla	180
GCCACTCAGGCCCCGGCCCCCGCCACACGCTAGTGGACCCCGAAGGCGTCTGGGATGCGAA	600
AlaThrGlnAlaArgProProProHisAlaSerGlyProArgArgArgLeuGlyCysGlu	200
CGGGCCTGGAACCATAGCGTCAGGGAGGCGGGGTCCCCCTGGGCCTGCCAGCCCCGGGT	660
ArgAlaTrpAsnHisSerValArgGluAlaGlyValProLeuGlyLeuProAlaProGly	220
GCGAGGAGGCGCGGGGGCAGTGCCAGCCGAAGTCTGCCGTTGCCCAAGAGGCCAGGCGT	720
AlaArgArgArgGlyGlySerAlaSerArgSerLeuProLeuProLysArgProArgArg	240

FIG. 1A

GGCGCTGCCCTGAGCCGGAGCGGACGCCCGTTGGGCAGGGTCTGGGCCACCCGGGC	780
GlyAlaAlaProGluProGluArgThrProValGlyGlnGlySerTrpAlaHisProGly	260
AGGACGCGTGGACCGAGTGACCGTGGTTTCTGTGTGGTGTACCTGCCAGACCCGCCGAA	840
ArgThrArgGlyProSerAspArgGlyPheCysValValSerProAlaArgProAlaGlu	280
GAAGCCACCTCTTTGGAGGGTGCCTCTCTGGCACGCGCCACTCCACCCATCCGTGGGC	900
GluAlaThrSerLeuGluGlyAlaLeuSerGlyThrArgHisSerHisProSerValGly	300
CGCCAGCACCACGCGGGCCCCCATCCACATCGCGGCCACCACGTCCCTGGGACACGCCT	960
ArgGlnHisHisAlaGlyProProSerThrSerArgProProArgProTrpAspThrPro	320
TGTCCCCCGGTGTACGCCGAGACCAAGCACTTCCTCTACTCCTCAGGCGACAAGGAGCAG	1020
CysProProValTyrAlaGluThrLysHisPheLeuTyrSerSerGlyAspLysGluGln	340
CTGCGGCCCTCCTTCCTACTCAGCTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTC	1080
LeuArgProSerPheLeuLeuSerSerLeuArgProSerLeuThrGlyAlaArgArgLeu	360
GTGGAGACCATCTTTCTGGGTTCAGGCCCTGGATGCCAGGGACTCCCCGAGGTTGCCC	1140
ValGluThrIlePheLeuGlySerArgProTrpMetProGlyThrProArgArgLeuPro	380
CGCCTGCCCCAGCGCTACTGGCAAATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACCAC	1200
ArgLeuProGlnArgTyrTrpGlnMetArgProLeuPheLeuGluLeuLeuGlyAsnHis	400
GCGCAGTGCCCCTACGGGGTGCTCCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTCACC	1260
AlaGlnCysProTyrGlyValLeuLeuLysThrHisCysProLeuArgAlaAlaValThr	420
CCAGCAGCCGGTGTCTGTGCCCCGGGAGAAGCCCCAGGGCTCTGTGGCGGCCCCCGAGGAG	1320
ProAlaAlaGlyValCysAlaArgGluLysProGlnGlySerValAlaAlaProGluGlu	440
GAGGACACAGACCCCCGTCGCCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCCCTGGCAG	1380
GluAspThrAspProArgArgLeuValGlnLeuLeuArgGlnHisSerSerProTrpGln	460
GTGTACGGCTTCGTGCGGGCCTGCCTGCGCCGGCTGGTGCCCCAGGCCTCTGGGGCTCC	1440
ValTyrGlyPheValArgAlaCysLeuArgArgLeuValProProGlyLeuTrpGlySer	480
AGGCACAACGAACGCCGCTTCCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCAT	1500
ArgHisAsnGluArgArgPheLeuArgAsnThrLysLysPheIleSerLeuGlyLysHis	500

**FIG. 1B**

GCCAAGCTCTCGCTGCAGGAGCTGACGTGGAAGATGAGCGTGCGGGGCTGCGCTTGGCTG	1560
AlaLysLeuSerLeuGlnGluLeuThrTrpLysMetSerValArgAspCysAlaTrpLeu	520
CGCAGGAGCCCAGGGGTGGCTGTGTTCCGGCCGCAGAGCACCGTCTGCGTGAGGAGATC	1620
ArgArgSerProGlyValGlyCysValProAlaAlaGluHisArgLeuArgGluGluIle	540
CTGGCCAAGTTCCTGCACTGGCTGATGAGTGTGTACGTCGTCGAGCTGCTCAGGTCTTTC	1680
LeuAlaLysPheLeuHisTrpLeuMetSerValTyrValValGluLeuLeuArgSerPhe	560
TTTTATGTCACGGAGACCACGTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTC	1740
PheTyrValThrGluThrThrPheGlnLysAsnArgLeuPhePheTyrArgLysSerVal	580
TGGAGCAAGTTGCAAAGCATTGGAATCAGACAGCACTTGAAGAGGGTGACGCTGCGGGAG	1800
TrpSerLysLeuGlnSerIleGlyIleArgGlnHisLeuLysArgValGlnLeuArgGlu	600
CTGTCGGAAGCAGAGGTCAGGCAGCATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGA	1860
LeuSerGluAlaGluValArgGlnHisArgGluAlaArgProAlaLeuLeuThrSerArg	620
CTCCGCTTCATCCCCAAGCCTGACGGGCTGCGGCCGATTGTGAACATGGACTACGTCGTG	1920
LeuArgPheIleProLysProAspGlyLeuArgProIleValAsnMetAspTyrValVal	640
GGAGCCAGAACGTTCCGCAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCA	1980
GlyAlaArgThrPheArgArgGluLysArgAlaGluArgLeuThrSerArgValLysAla	660
CTGTTTCAGCGTGCTCAACTACGAGCGGGCGCGGCCCGCCCTCCTGGGCGCCTCTGTG	2040
LeuPheSerValLeuAsnTyrGluArgAlaArgArgProGlyLeuLeuGlyAlaSerVal	680
CTGGGCCTGGACGATATCCACAGGGCCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCCAG	2100
LeuGlyLeuAspAspIleHisArgAlaTrpArgThrPheValLeuArgValArgAlaGln	700
GACCCGCCGCTGAGCTGTACTTTGTCAAGGTGGATGTGACGGGCGCGTACGACACCATC	2160
AspProProProGluLeuTyrPheValLysValAspValThrGlyAlaTyrAspThrIle	720
CCCCAGGACAGGCTCACGGAGGTCATCGCCAGCATCATCAAACCCAGAACACGTACTGC	2220
ProGlnAspArgLeuThrGluValIleAlaSerIleIleLysProGlnAsnThrTyrCys	740
GTGCGTCGGTATGCCGTGGTCCAGAAGGCCGCCCATGGGCACGTCCGCAAGGCCTTCAAG	2280
ValArgArgTyrAlaValValGlnLysAlaAlaHisGlyHisValArgLysAlaPheLys	760

FIG. 1C

AGCCACGTCTCTACCTTGACAGACCTCCAGCCGTACATGCCACAGTTCGTGGCTCACCTG SerHisValSerThrLeuThrAspLeuGlnProTyrMetArgGlnPheValAlaHisLeu	2340 780
CAGGAGACCAGCCCGCTGAGGGATGCCGTCGTCATCGAGCAGAGCTCCTCCCTGAATGAG GlnGluThrSerProLeuArgAspAlaValValIleGluGlnSerSerSerLeuAsnGlu	2400 800
GCCAGCAGTGGCCTCTTCGACGTCTTCCTACGCTTCATGTGCCACCACGCCGTGCGCATC AlaSerSerGlyLeuPheAspValPheLeuArgPheMetCysHisHisAlaValArgIle	2460 820
AGGGGCAAGTCCTACGTCCAGTGCCAGGGGATCCCGCAGGGCTCCATCCTCTCCACGCTG ArgGlyLysSerTyrValGlnCysGlnGlyIleProGlnGlySerIleLeuSerThrLeu	2520 840
CTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGCGGGGATTCGGCGGGAC LeuCysSerLeuCysTyrGlyAspMetGluAsnLysLeuPheAlaGlyIleArgArgAsp	2580 860
GGGCTGCTCCTGCGTTTGGTGGATGATTTCTTGGTGGTGACACCTCACCTCACCCACGCG GlyLeuLeuLeuArgLeuValAspAspPheLeuLeuValThrProHisLeuThrHisAla	2640 880
AAAACCTTCCTCAGGACCCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAAGTTC LysThrPheLeuArgThrLeuValArgGlyValProGluTyrGlyCysValValAsnLeu	2700 900
CGGAAGACAGTGGTGAAGTTCCTGTAGAAGACGAGGCCCTGGGTGGCACGGCTTTTGTT ArgLysThrValValAsnPheProValGluAspGluAlaLeuGlyGlyThrAlaPheVal	2760 920
CAGATGCCGGCCACGGCCTATTCCCCTGGTGCGGCCTGCTGCTGGATACCCGGACCCTG GlnMetProAlaHisGlyLeuPheProTrpCysGlyLeuLeuLeuAspThrArgThrLeu	2820 940
GAGGTGCAGAGCGACTACTCCAGCTATGCCCGGACCTCCATCAGAGCCAGTCTCACCTTC GluValGlnSerAspTyrSerSerTyrAlaArgThrSerIleArgAlaSerLeuThrPhe	2880 960
AACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGCAAACTCTTTGGGGTCTTGCGGCTG AsnArgGlyPheLysAlaGlyArgAsnMetArgArgLysLeuPheGlyValLeuArgLeu	2940 980
AAGTGTACAGCCTGTTTCTGGATTTGCAGGTGAACAGCCTCCAGACGGTGTGCACCAAC LysCysHisSerLeuPheLeuAspLeuGlnValAsnSerLeuGlnThrValCysThrAsn	3000 1000
ATCTACAAGATCCTCCTGCTGCAGGCGTACAGGTTTCACGCATGTGTGCTGCAGCTCCCA IleTyrLysIleLeuLeuLeuGlnAlaTyrArgPheHisAlaCysValLeuGlnLeuPro	3060 1020

FIG. 1D

TTTCATCAGCAAGTTTGAAGAACCCACATTTTCTGCGCGTCATCTCTGACACGGCC	3120
PheHisGlnGlnValTrpLysAsnProThrPhePheLeuArgValIleSerAspThrAla	1040
TCCCTCTGCTACTCCATCCTGAAAGCCAAGAACGCAGGGATGTCGCTGGGGGCCAAGGGC	3180
SerLeuCysTyrSerIleLeuLysAlaLysAsnAlaGlyMetSerLeuGlyAlaLysGly	1060
GCCGCCGGCCCTCTGCCCTCCGAGGCCGTGCAGTGGCTGTGCCACCAAGCATTCTGCTC	3240
AlaAlaGlyProLeuProSerGluAlaValGlnTrpLeuCysHisGlnAlaPheLeuLeu	1080
AAGCTGACTCGACACCGTGTACCTACGTGCCACTCCTGGGGTCACTCAGGACAGCCCAG	3300
LysLeuThrArgHisArgValThrTyrValProLeuLeuGlySerLeuArgThrAlaGln	1100
ACGCAGCTGAGTCGGAAGCTCCCGGGGACGACGCTGACTGCCCTGGAGGCCGAGCCAAC	3360
ThrGlnLeuSerArgLysLeuProGlyThrThrLeuThrAlaLeuGluAlaAlaAlaAsn	1120
CCGGCACTGCCCTCAGACTTCAAGACCATCCTGGACTgatggccacccgcccacagccag	3420
ProAlaLeuProSerAspPheLysThrIleLeuAsp	1132
Gccgagagcagacaccagcagccctgtcacgcccgggctctacgtcccagggagggagggg	3480
Cggcccacacccaggcccgacccgctgggagtctgaggcctgagtgagtgtttggccgag	3540
gcctgcatgtccggctgaaggctgagtgtccggctgaggcctgagcgagtgtccagccaa	3600
gggctgagtgtccagcacacctgccgtcttcacttccccacaggctggcgctcggctcca	3660
ccccagggccagcttttcctcaccaggagcccggttccactccccacataggaatagtc	3720
catccccagattcgccattgttcacccctcgccctgcccctcctttgccttccacccccac	3780
catccaggtggagaccctgagaaggaccctgggagctctgggaatttgagtgaccaaag	3840
gtgtgccctgtacacaggcgaggaccctgcacctggatgggggtccctgtgggtcaaatt	3900
ggggggaggtgctgtgggagtaaaatactgaatatatgagtttttcagttttgaaaaaaa	3960
aaaa	3964

FIG. 1E

Euplotes 1 -----MEVD DNQA MHGHS LATCEEIKEA TSW KVIRC --N EQH D E IX  
 HT1 1 RRLGPGQWRLVQRGDPAAPRALVAQCL CVFWAR PPP APPFRQVSCLE VARVLQR CE GAKNVLAQFPA GN  
 EST2 1 -----M I I E F D K I D I D --L E S T I A N K C G

Euplotes 56 I QTHIVA PRDYNEEDFKV RK -----E V F S T G L O E R K E W E S S S D V S D R Q K L Q Q K G Q -E A K  
 HT1 80 RGGPPHAPT SVRSY EVTE KGGGAWGLLARV DVLVH EAR ALV VAPSCAY ---QV GPPLYQLGAATCA  
 EST2 30 R WGLDEIL T -C P A P K K P -----C E P L S H K A V E E L I E G E L Y N N ---V L T E K I A R E D V H

Euplotes 126 HLLT LSTQKQYFPQDE QVRAMT ME RH YTK L L F R T E G T L V F C M V F D H L K V N D K F D K Q K G G A A D M N E  
 HT1 137 R P P P S G P R R R G C E R M S V R E A L V P G E P A P G A R R G G S A R S L P E P K R P R G A A E P E R T P G Q G W A H P G R T R G  
 EST2 97 S L F C S A N V E V T L A G A K M F H S L T T Y A T D L I N T W I F N G Q -F P T I V C N E H L P P K W Q H S S S

Euplotes 206 A C C I T K Y N V E K D E F L N I -----N V E W N N M K S R T R I P C T E F R N N I  
 HT1 237 S D R G F V V S P A R P A E A S L Z G A L S G T R H S H P S V G R Q H H A G P P S T S R P P R P W D T C P V Y A E T H S S G D K --E L A  
 EST2 169 -----P A T A A Q I Q L T P V I -----Q E K L N I -S S S

Euplotes 255 K K H E F V M K N N S A M -R A G T N I -----P Y N R K K O K W I Z K I A Y M E K V D F E N Y Y T K S P N W R E  
 HT1 315 S P L S L E P L T G A R R V L G S R P W N P G T P R P L Y -W Q M R P L F L Z G N A Q C P G V L K T H R A K V T P  
 EST2 200 Y S K I L P S S S K K E T R A A P -----T N V L V R I N L T E Q K K R L R L V S I N E I P L G T --

Telomerase domain

Euplotes 326 R K -----Q I E N L N K T K S --K Y T E E P S Y T T D N K C T Q N E F F Y N I K D F L T G E R K N Q K V E N E  
 HT1 394 A A G V C A R E P Q G S V A A P E D T D P R R L V Q L A Q B S P W Q Y G V R A C R R V P G L W H E R R L A T E I G A  
 EST2 268 -----V L D S H L S Q -----P K R L A I V I Q E M F K K K G K I I E N L E P L N G

Euplotes 398 L I H K N L E I N T E I S M O V E T -S A R E F Y Y D H E I V W L R I E D S C Q Q K Y S K T Y N I  
 HT1 474 K S L Q E T W M S V C A R R P G V G C V P A A E H R E E I A H M S V Y E L L S T T F Q K N R L E P S V  
 EST2 324 Y P P D S K L R L A R P F I D -I W P T K E N E N -Q L A C I S R Q I P K I Q T C I S -T V T V P H D T

Motif 1 Motif 2

Euplotes 477 D V I M K M S A D L A -E T A V Q K E Z W K K S L -G A P G L E T T -M T F N K K I V N S D R K --P T L T N T K E L  
 HT1 554 S Q S I G R Q H L R V Q R L S A R Q E R E A P A L L T R P P O G -L V N M D Y V V G A R T R R E K R A R L T S R V K  
 EST2 401 N L T P P V E Y F -T Y V N N V C R N E S Y T L S -N M H M I S N N E I A I P C R G A D E E Z T -I Y N H K N A L Q

Motif A

Euplotes 551 N S H L M K T K I -M F K D P P A P M Y V M K Y E E C W K Q V G Q -K P A T M E K K V N E K S T F T K L L S S  
 HT1 632 A L P S V N E S A R -P G L L A L G L C E R A W R T R V R A Q D P P V V T G A T Q D R I E V I A S I I P Q  
 EST2 477 P T Q K I E K P T S F T K Y P T Q I A R I E F K Q R L K F N V L -M F K S M E C M R I D A L N E

Euplotes 629 D V I N T A Q I L R A R N I L D S K P R K K E M K D Y F R Q K F Q K I A L E G G Q Y T D F S V L E N E N D L N A K K T L E V A K -Q R Y K D  
 HT1 710 T Y C R Y A V V Q K A A H E V R K A F K S H V S -----T L T D L Q Y M R Q P V A H L E S P R D A V Q S S S L E A S S G  
 EST2 556 G P S Q Y F F N -T T L K L F V V N -----A -S R V K P Y E L Y I D N V R V H S N Q D N V V -E M E I T

Motif B Motif C

Euplotes 708 N L L Q P I N I Q Y N Y I N E N F K T R L C V S I S F Y A T S S L G L R D E M N P E N P N V N M T Y  
 HT1 777 L P D V E L A F M H H A V R I R -S I V C C I E T L C C G M N ---K L F G I R R ---G V V I  
 EST2 616 --A L W E D K Y I R -----E D L F S A P I V D V D L F Y S E K S P Q -----T I R I A H S

Motif D Motif E

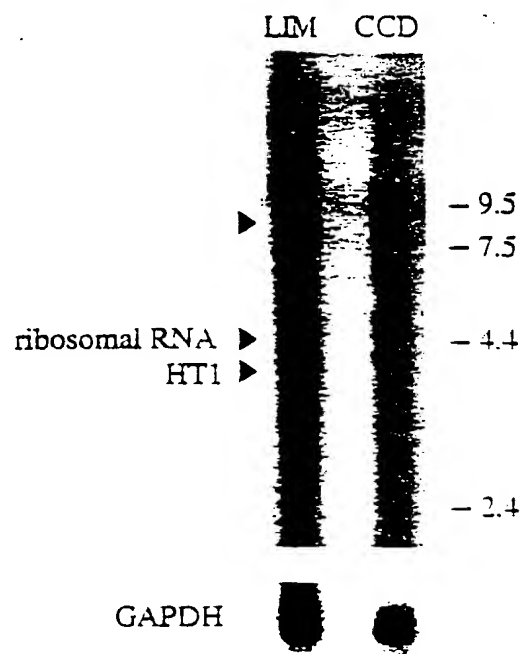
Euplotes 788 Q E N N L E E I N V S R N K P M K L Q T S S P K F A R Y G M D V E E Q N I Q D Y D W I G I S I D M K T L A L P N I L R I  
 HT1 847 P H L T E K T L R T V R V P Y C W Y L R T V V N V E D E A L G G -T A F V M P A G L F P W G L L D T R T Q S D Y S Y A R --  
 EST2 677 D Q Q -Q I N K L A M -----Q K Y N A A N R D K I A V -----S D D O T I Q F A M H I F V K E W K H S T M ---

Euplotes 868 E G L C T L M Q T K A S M W L K R P L M N N I H Y F R T E D F A N K L N L F I S G G K E M Q A E Y --K D H F R L A M  
 HT1 924 T S R A S T R G F A G R N M R R L G Y R L A C H S L P L D L Q V N S L Q T V C T N I Y I L L Q A R F H A V L Q L F P H Q Q W E P  
 EST2 741 -----H I R S S S ---G I R A L A L P N R I S Y D N L N S T N V L M Q I D H V V K N I S E Y S A --F K D E S I V I Q

Euplotes 946 S S M I D L E V S K V T R P P K Y L V C N I P F G E H Y P D P S T K E I I F T K Y I N R V C M K A K K S D Q C Q S  
 HT1 1004 P L R V I D T A S L C I L K K N A G M S L G A G A A G P L P S E A V Q W C -H Q A L K T R H R V T Y P L L G S I R T A C T S R K L P G T  
 EST2 808 N M Q F H P L Q R E M T V S G ---C P I T K C P L I E Y V R --T I --N G S S N T S K -K D N I L R I H L Q A Y I Y

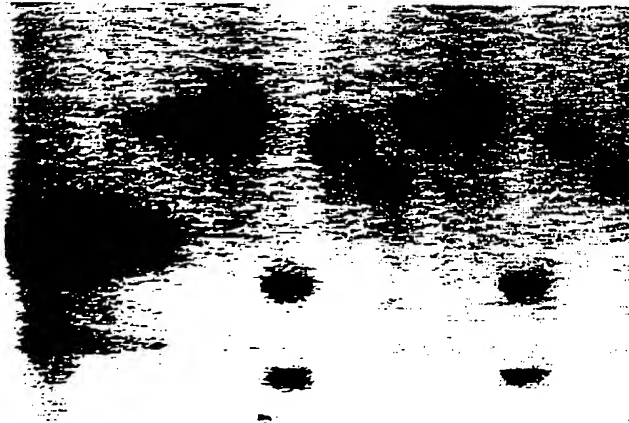
Euplotes 1026 L Q Y D A -----  
 HT1 1083 T L T A L Z A A A N P A L P S D F K T I L D  
 EST2 879 Y H I V N -----

FIG. 2



*FIG. 3*

Plasmid			Human blood				LIM1215					
10	5	1	H	E	P	X	B	H	E	P	X	B



**FIG. 4**

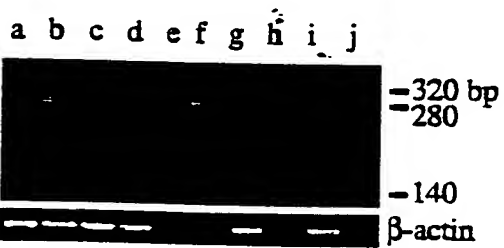


a b c d e f g h i j k l m n o p

HT1

$\beta$ -actin

*FIG. 5*



**FIG. 6**

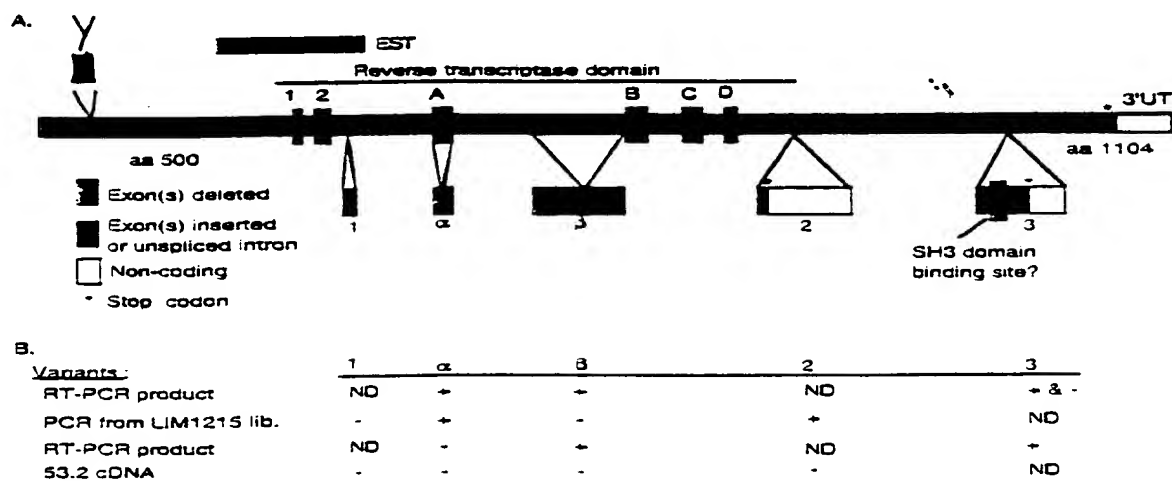


FIG. 7A and 7B

C

222  
Y 5'-CCAGGTG|ggcctc

223  
gcaggtg|TCCTGCC-3'

1950  
1 5'-AAAGAGG|GTGGCTG.....AACAGAA|GCCGAGC-3'

2130  
α 5'-TGTCAGG|gtggatg.....ccccag|GACAGGC-3'

2167  
2286  
β 5'-GAGCCAC|gtctcta.....ggggcaa|GTCCTAC-3'

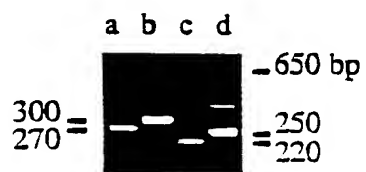
2468  
2843  
2 5'-ACTCCAG|GTGAGCG.....XXXXXXXX|CTATGCC-3'

2844  
3157  
3 5'-AACGCAG|CCGAGAGAAACATTCTGTCTGCTACTCTCCCTGCTTGGCTGGGACAGCCAGAGATGG  
T A A E E N I L V V T P A V L G S G Q P E M E  
AGCCACCCCCCAGACCGTCGGGTGTGGCCAGCTTCCGGTGTCTCTGGGAGGGGAGTTC  
P P R R P S G V G S F P V S P G R G V G  
3158  
GGCTGGGCTGTGACTCTCTCAGCCCTCTGTTTCCCCCAG|GGATGTC-3'  
L G L \*

FIG. 7C



*FIG. 8*



**FIG. 9**

**sequence "γ" 104-105 bases**

GGCCTCCCCGGGGTCCGGCTCCGGCTGGGGTTGAGGGCGGCCGGGGGAACCAG  
GlyLeuProGlyValGlyValArgLeuGlyLeuArgAlaAlaGlyGlyAsnGln  
AlaSerProGlySerAlaSerGlyTrpGly \* GlyArgProGlyGlyThrSer  
ProProArgGlyArgArgProAlaGlyValGluGlyGlyArgGlyGluProAla

CGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG  
ArgHisAlaGluSerSerAlaGlyAspSerGlyArgPheProArgArg  
AspMetArgArgAlaAlaGlnAlaThrGlnGlyAlaSerProAlaGly  
ThrCysGlyGluGlnArgArgArgLeuArgAlaLeuProProGlnVal

**sequence "1" 38 bases**

GTGGCTGTGCTTTGGTTTAAGTTCCTTTTTTAACCAGAA  
ValAlaValLeuTrpPheAsnPheLeuPheAsnGlnLys

**sequence "α" 36 bases**

GTGGATGTGACGGGCGCGTACGACACCATCCCCCAG  
ValAspValThrGlyAlaTyrAspThrIleProGln

**sequence "β" 182 bases**

GTCTCTACCTTGACAGACCTCCAGCCGTACATGCGACAGTTCGTGGCTCACCTG  
ValSerThrLeuThrAspLeuGlnProTyrMetArgGlnPheValAlaHisLeu

CAGGAGACCAGCCCGCTGAGGGATGCCGTCGTCATCGAGCAGAGCTCCTCCCTG  
GlnGluThrSerProLeuArgAspAlaValValIleGluGlnSerSerSerLeu

AATGAGGCCAGCAGTGGCCTCTTCGACGTCTTCCTACGCTTCATGTGCCACCAC  
AsnGluAlaSerSerGlyLeuPheAspValPheLeuArgPheMetCysHisHis

GCCGTGCGCATCAGGGGCAA  
AlaValArgIleArgGlyLys

**partial sequence "2" unknown length**

GTGAGCGCACCTGGCCGGAAGTGGAGCCTGTGCCCCGGCTGGGGCAGGTGCTGCTGCAG  
Ter

GGCCGTTGCGTCCACCTCTGCTTCCGTGTGGGGCAGGCGACTGCCAATCCCAAAGGGT  
CAGATGCCACAGGGTGGCCCTCGTCCCCTGAGCACAAATGCATCTTTCTG  
TGGGAGTGAGGGTGCCTCACAACGGGAGCAGTTTCTGTGCTATTTTGGTAA...

**sequence "3" 159 bases**

CCGAAGAAAACATTTCTGTCGTGACTCCTGCGGTGCTTGGGTCGGGACAGCCAGAG  
AlaGluGluAsnIleSerValValThrProAlaValLeuGlySerGlyGlnProGlu

ATGGAGCCACCCCGCAGACCGTCGGGTGTGGGCAGCTTTCGGGTGTCTCCTGGGAGG  
MetGluProProArgArgProSerGlyValGlySerPheProValSerProGlyArg

GGAGTTGGGCTGGGCCTGTGACTCCTCAGCCTCTGTTTTCCCCCAG  
GlyValGlyLeuGlyLeu \*

**FIG. 10A**

**sequence "X" unknown length**

...GACAGTCACCAGGGGGGTTGACCGCCGGACTGGGCGTCCCCAGGGTTGACTATAGGA  
CCAGGTGTCCAGGTGCCCTGCAAGTAGAGGGGCTCTCAGAGGCGTCTGGCTGGCATGG  
GTGGACGTGGCCCCGGGCATGGCCTTCTGCGTGTGCTGCCGTGGGTGCCCTGAGCCCT  
CACTGAGTCGGTGGGGGCTTGTGGCTTCCCCTGAGCTTCCCCCTAGTCTGTTGTCTGG  
CTGAGCAAGCCTCCTGAGGGGCTCTCTATTG

**partial sequence of genomic intron (approximately 2.7 kb)**

GTGGCTGTGCTTTGGTTTAACTTCCTTTTTTAACCAGAAGTGCCTTGAGCCCCACATT  
TGGTATCAGCTTAGATGAAGGGCCCGGAGGAGGGGCCACGGGACACAGCCAGGGCCAT  
GGCACGGCGCCCACTTTGTGCGCACAGTGAGGTGGCCGAGGTGCCGGTGCCTCCA  
GAAAAGCAGCGTGGGGGTGTAGGGGGAGCTCCTGGGGCAGGGAC....

**FIG. 10B**



[illegible]

**FIG. 11A**

Truncated protein 1

ATGCGCGCGCTCCCGCGTGGCGAGCGGTGGCGTCCCTGCTGGCAGGCACTACCGCGAGGTGCTGGCGCTGGCCAGCGTGTGTT  
M P R A P R C R A V R S L L R S H T R E V L P L A T F V

CGCGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGCAGCGCGGGGACCGCGCGCTTTCGCGCGCTGGTGGCCAGTGCCTGGTGTGCGTGCCTGGGAGCAGCGCGCGCCCCCGCGCG  
R R L G P Q G W R L V Q R G D P A A P R A L V A Q C L V C V P W D A R P P P A A

CCCTTCCTTCGCGAGGCTGCTCGCTGAAGGAGCTGGTGGCGCCGAGTGCCTGCAGGCTGTGCGAGCGCGGCGGAGAAAGCTGTGGCGCTTCGGCTTCGCGCTGCTGGAGCGGGCGCG  
P S F R Q V S C L K E L V A R V L Q R L C S R G A K N V L G P A L L D G A R

CGGGGGCCCCCGAGCGCTTCAACCACCGAGTGGCGAGCTACCTGCCCAACCGTGACCGACGCACTCGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCGCGCGTGGGCGAGCAGCT  
G G P P E A P T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCGTGGCGGCTCTTTTGCTGGTGGCTCCCGAGTGGCGCTTACCAGTGTGCGGGCGCGCGCTGTACACAGTTCGGCGCTGCCACTCAGGCCCGCGCCCCCGC  
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCCGAGCGCTGCGGATCGGAACCGGCTGGAACATAGCGTCAGGAGGCGCGGGCTCCCCCTGGGCTGCCAGCCCGGGTGCAGGAGGCGCGGGGCGAGTGC  
H A S G P R R L G C E R A W N H S V R S A G V P L G L P A P G A R R G G S A

CAGCCGAAGTCTCGCTTGCCTCAAGAGGCGCCAGGCGTGGCGCTGCGCTCGCGCGAGCGGAGCGCGCTTGGCAGGGGCTCTGGGCGCACCGGGCAGGAGCGCTGGAACGAGTGAACG  
S R S L P L P K R P R E G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCGTGTGGTGTCACTGCCAGACCGCGCGAAGAAGCCACTCTTTGGAGGGTGGCGTCTCTGGCAGCGGCCACTCCCAACCATCCGTGGGGCGCGCAGCACCGCGGGCCCCC  
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCACTGCTCCCTGGGACACGCTTGTCCCCCGGTGTACCGCGAGACAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGTTCGGCGCCTCCTTCTACTCTAG  
S T S R P P P R P W D T P C P P V Y A E T K H P L Y S S G D K S Q L R P S P L L S

CTCTCTGAGGCGCCAGCGCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTCTGGTTCAGGCGCTGGATCCAGGGACTCCCCCGAGGTTCGCCCGGCTGCCCGAGCGCTACTGGCA  
S L R P S L T G A R R L V E T I F L G S R P W N P G T P R R L P R L P Q R Y W

AATCGCGGCCCTGTTCCTGGAGCTGCTTGGGAACACGCGCAGTGGCGCTACCGGCTGCTCTCAAGACGCACTCGCGCGCTCGGAGCTCGGGTCAACCCAGCAGCGCGGTGTCTGTGCGCG  
M R P L P L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGGCCCCGAGGAGGAGGACACAGACGCGCGTGGCGTGTGCGAGTGTCTCCCGCAGCACAGCAGCGCGCTGGCAGGTGTACGGTCTCTGTGGCGGCGT  
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G P V R A C

CCTGCGCGCGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCAACACGAAACCGCGCTTCTTCAGGAACCAACGAAGTTCATCTCCCTGGGGAAGCATGCCAAGCTCTCGCTCAGGAGGT  
L R R L V P P G L G S R H N E R P L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCGTCCGGGACTCGCGCTTGGCTCGCGAGGAGCCAGCGGTGGCGTGTCTCGCGCGCAGACGACGCTCTGCGTGAGGAGATCTCGGCCAAGTTCCTGCACTGGCT  
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGACGTCGTCGAGCTGCTCAGGTCTTTCTTTATGTGACGAGACCACTTTCAAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTCGAAAGCATGG  
M S V Y V V E L L R S P P Y V T E T T P Q X N R L P P Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGCGGTGACGTCGCGGAGCTGTGCGAAGCAGAGGTCAAGCAGCATCGGAAGCAGGCGCGCGCTGCTGACGTCAGACTCGCGTTCATCCCCAAGCGCTGA  
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R P I P K P D

GTGGCTGTGCTTTGGTTTAACTTCCTTTTAAACAGAA  
V A V L W P T F L P N Q K

CGGGCTCGCGCGCATTTGGAACATGGACTACGTCGTCGGGAGCGAGAACCTTCCGAGAGAAAGAGGCGCGAGCTCTCACCTCGAGGGTGAAGGCACTGTTTCAGCGTGTCTCAACTACGAA  
G L R P I V N M D Y V V G A R T P R E E K R P S V S P R G

**FIG. 11B**

ATGCCGCGCGCTCCCGGTGCGGAGCGGTGCGCTCCCTGCTGCGCAGCCACTACGCGGAGGTGCTGCCGCTGGCCACGTTCTGTG  
M P R A P R C R A V R S L L R S H T R E V L P L A T F V

CCGGCGCTCGGGGCCCCAGGGCTGGCGGCTGGTGCGACCGCGGGGACCCCGCGGCTTTCCGCGCGCTGGTGCCCGCAGCTGCTGGTGTCGCTGCCCTGGGACGCACGGCGCCGCCCGCGCGG  
R R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCTCTCTTCGGCCAGGTGTCCTGCTGAAGGAGCTGGTGCGCCGAGTGCCTGCAGAGGCTGTGCGAGCGCGGGCGGAGAACGTGCTGCGCTTCGGCTTCGGCGTCTGGAACGGGGCCCG  
P S P R P Q V S C L K E L V C A R L T C E R G A C K N V L A G F A L D G A R

CGGGGGCCCCCGAGGCTTCACCCAGCAGCTGTCAGAGCTACTTGCCTCAACCGGTGACCGCAGCACTGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCCCGCGCTGGCGGACGACGT  
G G P P E A P T T S V R S Y L P N T V T D A L R G S G A W G L L L L R R V G D D V

GCTGGTTCACTGCTGCGCAGCTGCGCGCTCTTTGTGCTGGTGCTCCAGCTGCGCTACCAGGTGTGCGGGCGCGCTGTACAGCTTCGGCGCTGCCACTCAGGCGCGCGCGCGCG  
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGACCCCGAAGCGCTCTGGGATGCGAACCGGGCTGGAACCATAGCGTCAGGAGGCGGGGGTCCCCCTGGCGCTGCCAGCCCGGGTGCAGGAGGCGCGGGGCGAGTGC  
H A S G P R R L L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCCGAAGTCTGCCCTTGCCCAAGAGGCCGAGCGTGGCGCTGCCCTTGAGCCGGAGCGGACGCCGTGGGGCCACCCGGGAGGACGCGTGGAGCGGAGTGCAGC  
S R S L P L P K R P P R G G A P P E R T P V G Q G S A H P G R T R G P S D R

TGGTTTCTGTGTGGTGTCACTGCCAGACCGCGCGAAGAGCCACTCTTTGGAGGGTGCCTCTCTGGCAGCGGCCACTCCACCCATCCGTGGGGCGCGCAGCACCGCGGGCCCCC  
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCGACCACTGCTCCCTGGGACACCGCTTGTCCCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCTCTCAGGCGCAAGAGGAGCAGTGC CGCGCTCTCTCTACTCAG  
S T S R P P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCGCCAGCCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTTCTGGTTCCAGGCGCTGGATCGCAGGAGCTCCCGCAGGTTGCCCGCGCTGCCCGAGCGCTACTGGCA  
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P R L P

AATCGCGGCCCCCTTTCTGAGAGTGTCTGGGAACACCGCGCAGTGCCTCTACGGGTGCTCTCAAGACGCACTGCCCGCTCGGAGCTGCGGTCAACCCAGCAGCGCGTGTCTGTGCCCG  
M R P L P L S L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGCTCTGTGGCGGCCCCCGAGGAGGAGGACACAGACCCCGCTGCGCTGGTGAGCTGCTCCGCGAGCACAGCAGCCCTGGCAGGTGTACGGTTCGTGGCGGCGCTG  
E K P Q G S V A A P S E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTCGCGCGCTGGTGCCTCCCGCAGGCTCTGGGGCTCCAGGCAACAGCAAGCGCGCTCTCTCAGGAACCAACGAAGTTCATCTCTCCCTGGGGAAGCATGCCAAGCTCTCGCTCAGGAGCT  
L R R L V P P G L W G S R H N E R R F L R N T K K P I S L G K H A K L S L Q E L

GAGCTGGAAGATGAGCGTGGCGGCTGCGCTGCGCGCAGGAGCCAGGGGTGGCGTGTCTCCGGCCGAGAGCAGCTCTCGGTGAGGAGATCTTGGCCAAGTCTCTGCACTGGCT  
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K P L H W L

GATGAGTGTGACGTGCTCGAGCTGCTCAGGTCTTTCTTTATGTGACGGAGACCATCTTCAAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTCGAAAGCATTTGG  
M S V Y V V E L L R S P F Y V T E T T P Q K N R L P P Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGGGTGACGTGCGCGAGCTGTGCGAAGCAGAGGTGAGGCGAGCATCGGAAGCGAGGCGCGCGCTGCTGAGCTCAGACTCCGCTTCATCCCAAGCGCTGA  
I R Q H L K R V Q L R S L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGCGCTCGGCGCGATTGTGAACATGGACATCGCTGCGGGGAGCGAGAAGCTTCCGAGGAGAAAAGGCGCGAGCTCTCAGCTCGAGGTTGAAGGCACTGTTCAGCGTCTCAACTACGA  
G L R P I V N M D Y V V G A R T F R R E K A R A G C T C S R V K A L P S V L N Y E

GCGGGCGCGCGCGCGCGGCTCTGGCGCGCTCTGTGCTGGGCTTGGAGATATCCACAGGCGCTGGCGGACCTTCTGCTGCTGCTGCGGGGCGAGGACCGCGCGCTGAGCTGTACTT  
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAGTGGATGTGACGGGCGGTACGACCATCCCCAGGACAGGCTCAGCGAGGCTCATGCCAGCATCATCAACCCGAGAACAGTACTGCGTGGCTCGGTATGCCGTGGTCCA  
V K V D V T G A Y D T I F P Q D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCGCGCCATGGGACAGTCCGCAAGGCGCTTCAAGAGCCAC  
K A A H G H V R K A P K S H

GTCCTACGTCCAGTG  
V L R P V

CCAGGGGATCCCGCAGGCTCCATCTCTCCACGCTGCTCTGCAGCCTGTGCTACGGGCACATGGAGAAACAGCTGTTTGGCGGGGATTCGGCGGGACGGGCTGCTCTGCGTTTGGTGA  
P G D P A G L H P L H A A L Q P V L R R H G E Q A V C G D S A G R A A P A P V G

TGATTCTGTGTTGGTGACACCTCACCTCACCCACGGCAAAACCTTCTCAGGACCTGGTCCGAGGTGTCCTTGAGTAGTATGGCTCGTGTTGAACTTCGGGAAGACAGTGGTGAACCTTCC

**FIG. 11C**

# Reference protein

ATGCCGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAG	60
MetProArgAlaProArgCysArgAlaValArgSerLeuLeuArgSerHisTyrArgGlu	20
GTGCTGCCGCTGGCCACGTTTCGTGCGGCGCCTGGGGCCCCAGGGCTGGCGGCTGGTGACG	120
ValLeuProLeuAlaThrPheValArgArgLeuGlyProGlnGlyTrpArgLeuValGln	40
CGCGGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCCCAGTGCTGGTGTGCGTGCCCTGG	180
ArgGlyAspProAlaAlaPheArgAlaLeuValAlaGlnCysLeuValCysValProTrp	60
GACGCACGGCCGCCCCCGCCGCCCTCCTTCCGCCAGGTGTCTGCCTGAAGGAGCTG	240
AspAlaArgProProProAlaAlaProSerPheArgGlnValSerCysLeuLysGluLeu	80
GTGGCCCCGAGTGCTGCAGAGGCTGTGCGAGCGCGGCGGAAGAAGCTGTGGCCTTCGGC	300
ValAlaArgValLeuGlnArgLeuCysGluArgGlyAlaLysAsnValLeuAlaPheGly	100
TTCGCGCTGCTGGACGGGGCCCGGGGGCCCCCGAGGCCTTCACCACCAGCGTGCGC	360
PheAlaLeuLeuAspGlyAlaArgGlyGlyProProGluAlaPheThrThrSerValArg	120
AGCTACCTGCCCAACACGGTGACCGACGCACTGCGGGGGAGCGGGGCGTGGGGGCTGCTG	420
SerTyrLeuProAsnThrValThrAspAlaLeuArgGlySerGlyAlaTrpGlyLeuLeu	140
TTGCGCCGCTGGGCGACGACGTGCTGGTTACCTGCTGGCACGCTGCGCGCTCTTTGTG	480
LeuArgArgValGlyAspAspValLeuValHisLeuLeuAlaArgCysAlaLeuPheVal	160
CTGGTGGCTCCCAGCTGCGCCTACCAGGTGTGCGGGCCCGCGCTGTACCAGCTCGGCGCT	540
LeuValAlaProSerCysAlaTyrGlnValCysGlyProProLeuTyrGlnLeuGlyAla	180
GCCACTCAGGCCCCGGCCCCCGCCACACGCTAGTGACCCCCGAAGGCGTCTGGGATGCGAA	600
AlaThrGlnAlaArgProProProHisAlaSerGlyProArgArgArgLeuGlyCysGlu	200
CGGGCCTGGAACCATAGCGTCAGGGAGGCCGGGGTCCCCCTGGGCCTGCCAGCCCCGGGT	660
ArgAlaTrpAsnHisSerValArgGluAlaGlyValProLeuGlyLeuProAlaProGly	220
GCGAGGAGGCGCGGGGCGAGTGCCAGCCGAAGTCTGCCGTTGCCCAAGAGGCCAGGCGT	720
AlaArgArgArgGlyGlySerAlaSerArgSerLeuProLeuProLysArgProArgArg	240
GGCGCTGCCCTGAGCCGGAGCGGACGCCCCGTGGGCAGGGGTCTGGGCCCCACCCGGGC	780
GlyAlaAlaProGluProGluArgThrProValGlyGlnGlySerTrpAlaHisProGly	260
AGGACGCGTGGACCGAGTGACCGTGGTTTTCTGTGTGTGTCACCTGCCAGACCCCGGAA	840
ArgThrArgGlyProSerAspArgGlyPheCysValValSerProAlaArgProAlaGlu	280
GAAGCCACCTCTTTGGAGGGTGCGCTCTCTGGCACGCGCCACTCCCACCCATCCGTGGGC	900
GluAlaThrSerLeuGluGlyAlaLeuSerGlyThrArgHisSerHisProSerValGly	300
CGCCAGCACCACGCGGGCCCCCATCCACATCGCGGCCACCACGTCCCTGGGACACGCCT	960
ArgGlnHisHisAlaGlyProProSerThrSerArgProProArgProTrpAspThrPro	320
TGTCCCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCCTCAGGCGACAAGGAGCAG	1020
CysProProValTyrAlaGluThrLysHisPheLeuTyrSerSerGlyAspLysGluGln	340
CTGCGGCCCTCCTTCTACTCAGCTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTC	1080
LeuArgProSerPheLeuLeuSerSerLeuArgProSerLeuThrGlyAlaArgArgLeu	360
GTGGAGACCATCTTTCTGGGTTCCAGGCCCTGGATGCCAGGGACTCCCCGAGGTTGCC	1140
ValGluThrIlePheLeuGlySerArgProTrpMetProGlyThrProArgArgLeuPro	380
CGCTGCCCCAGCGCTACTGGCAAATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACCAC	1200
ArgLeuProGlnArgTyrTrpGlnMetArgProLeuPheLeuGluLeuLeuGlyAsnHis	400
GCGCAGTGCCCCCTACGGGGTGCTCCTCAAGACGCACTGCCCCGCTGCGAGCTGCGGTACC	1260
AlaGlnCysProTyrGlyValLeuLeuLysThrHisCysProLeuArgAlaAlaValThr	420

FIG. 11D

CCAGCAGCCGGTGTCTGTGCCCCGGGAGAAGCCCCAGGGCTCTGTGGCGGCCCCGAGGAG	1320
ProAlaAlaGlyValCysAlaArgGluLysProGlnGlySerValAlaAlaProGluGlu	440
GAGGACACAGACCCCCCTGCGCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCCCTGGCAG	1380
GluAspThrAspProArgArgLeuValGlnLeuLeuArgGlnHisSerSerProTrpGln	460
GTGTACGGCTTCGTGCGGGCCTGCCTGCGCCGGCTGGTGCCCCCAGGCCTCTGGGGCTCC	1440
ValTyrGlyPheValArgAlaCysLeuArgArgLeuValProProGlyLeuTrpGlySer	480
AGGCACAACGAACGCGGCTTCCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCAT	1500
ArgHisAsnGluArgArgPheLeuArgAsnThrLysLysPheIleSerLeuGlyLysHis	500
GCCAAAGCTCTCGCTGCAGGAGCTGACGTGGAAGATGAGCGTGCGGGGCTGCGCTTGCTG	1560
AlaLysLeuSerLeuGlnGluLeuThrTrpLysMetSerValArgAspCysAlaTrpLeu	520
CGCAGGAGCCCAGGGGTTGGCTGTGTTCCGGCCGAGAGCACCGTCTGCGTGAGGAGATC	1620
ArgArgSerProGlyValGlyCysValProAlaAlaGluHisArgLeuArgGluGluIle	540
CTGGCCAAGTTCCTGCACTGGCTGATGAGTGTGTACGTCGAGCTGCTCAGGTCTTTC	1680
LeuAlaLysPheLeuHisTrpLeuMetSerValTyrValValGluLeuLeuArgSerPhe	560
TTTTATGTACGGAGACCACGTTTCAAAGAAGAGGCTCTTTTTCTACCGGAAGAGTGTC	1740
PheTyrValThrGluThrThrPheGlnLysAsnArgLeuPhePheTyrArgLysSerVal	580
TGGAGCAAGTTGCAAAGCATTGGAATCAGACAGCACTTGAAGAGGGTGACGTGCGGGAG	1800
TrpSerLysLeuGlnSerIleGlyIleArgGlnHisLeuLysArgValGlnLeuArgGlu	600
CTGTGCGAAGCAGAGGTCAGGCAGCATCGGAAGCCAGGCCCGCCTGCTGACGTCCAGA	1860
LeuSerGluAlaGluValArgGlnHisArgGluAlaArgProAlaLeuLeuThrSerArg	620
CTCCGCTTCATCCCCAAGCCTGACGGGCTGCGGCCGATTGTGAACATGGACTACGTCTGTG	1920
LeuArgPheIleProLysProAspGlyLeuArgProIleValAsnMetAspTyrValVal	640
GGAGCCAGAACGTTCCCGCAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCA	1980
GlyAlaArgThrPheArgArgGluLysArgAlaGluArgLeuThrSerArgValLysAla	660
CTGTTACAGCGTGCTCAACTACGAGCGGGCGCGGCCCGCCTCCTGGGCGCCTCTGTG	2040
LeuPheSerValLeuAsnTyrGluArgAlaArgArgProGlyLeuLeuGlyAlaSerVal	680
CTGGGCTTGGACGATATCCACAGGGCCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCCAG	2100
LeuGlyLeuAspAspIleHisArgAlaTrpArgThrPheValLeuArgValArgAlaGln	700
GACCCCGCGCCTGAGCTGTACTTTGTCAAGTGATGTGACGGGCGCGTACGACACCATC	2160
AspProProProGluLeuTyrPheValLysValAspValThrGlyAlaTyrAspThrIle	720
CCCCAGGACAGGCTCACGGAGGTTCATCGCCAGCATCATCAAACCCAGAACACGTACTGC	2220
ProGlnAspArgLeuThrGluValIleAlaSerIleIleLysProGlnAsnThrTyrCys	740
GTGCGTCCGTATGCCGTGGTCCAGAAGGCCGCCCATGGGCACGTCCGCAAGGCCTTCAAG	2280
ValArgArgTyrAlaValValGlnLysAlaAlaHisGlyHisValArgLysAlaPheLys	760
AGCCACGTCTCTACCTTGACAGACCTCCAGCCGTACATGCGACAGTTCGTGGCTCACCTG	2340
SerHisValSerThrLeuThrAspLeuGlnProTyrMetArgGlnPheValAlaHisLeu	780
CAGGAGACCAGCCCGCTGAGGGATGCCGTGCTCATCGAGCAGAGCTCCTCCCTGAATGAG	2400
GlnGluThrSerProLeuArgAspAlaValValIleGluGlnSerSerSerLeuAsnGlu	800
GCCAGCAGTGGCCTCTTCGACGTCTTCCTACGCTTCATGTGCCACCACGCCGTGCGCATC	2460
AlaSerSerGlyLeuPheAspValPheLeuArgPheMetCysHisHisAlaValArgIle	820
AGGGGCAAGTCTACGTCCAGTGCCAGGGGATCCCGCAGGGCTCCATCCTCTCCACGCTG	2520
ArgGlyLysSerTyrValGlnCysGlnGlyIleProGlnGlySerIleLeuSerThrLeu	840
CTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGGCGGGATTTCGGCGGGAC	2580
LeuCysSerLeuCysTyrGlyAspMetGluAsnLysLeuPheAlaGlyIleArgArgAsp	860
GGGCTGCTCCTGCGTTTGGTGGATGATTTCTGTTGGTGACACCTCACCTCACCCACGCG	2640

FIG. 11E

GlyLeuLeuLeuArgLeuValAspAspPheLeuLeuValThrProHisLeuThrHisAla	880
AAAACCTTCCTCAGGACCCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAACCTG	2700
LysThrPheLeuArgThrLeuValArgGlyValProGluTyrGlyCysValValAsnLeu	900
CGGAAGACAGTGGTGAACCTTCCTGTAGAAGACGAGGCCCTGGGTGGCACGGCTTTTGTT	2760
ArgLysThrValValAsnPheProValGluAspGluAlaLeuGlyGlyThrAlaPheVal	920
CAGATGCCGGCCACGGCCTATTCCCCTGGTGGCCTGCTGCTGGATACCCGGACCCTG	2820
GlnMetProAlaHisGlyLeuPheProTrpCysGlyLeuLeuLeuAspThrArgThrLeu	940
GAGGTGCAGAGCGACTACTCCAGCTATGCCCGGACCTCCATCAGAGCCAGTCTCACCTTC	2880
GluValGlnSerAspTyrSerSerTyrAlaArgThrSerIleArgAlaSerLeuThrPhe	960
AACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGCAAACTCTTTGGGGTCTTGCGGCTG	2940
AsnArgGlyPheLysAlaGlyArgAsnMetArgArgLysLeuPheGlyValLeuArgLeu	980
AAGTGTACAGCCTGTTTCTGGATTTGCAGGTGAACAGCCTCCAGACGGTGTGCACCAAC	3000
LysCysHisSerLeuPheLeuAspLeuGlnValAsnSerLeuGlnThrValCysThrAsn	1000
ATCTACAAGATCCTCCTGCTGCAGGCGTACAGGTTTCACGCATGTGTGCTGCAGTCCCA	3060
IleTyrLysIleLeuLeuLeuGlnAlaTyrArgPheHisAlaCysValLeuGlnLeuPro	1020
TTTCATCAGCAAGTTTGAAGAACCCACATTTTCTGCGCGTCATCTCTGACACGGCC	3120
PheHisGlnGlnValTrpLysAsnProThrPhePheLeuArgValIleSerAspThrAla	1040
TCCCTCTGCTACTCCATCCTGAAAGCCAAGAACGCAGGGATGTCGCTGGGGGCAAGGGC	3180
SerLeuCysTyrSerIleLeuLysAlaLysAsnAlaGlyMetSerLeuGlyAlaLysGly	1060
GCCGCCGGCCCTCTGCCCTCCGAGGCCGTGCAGTGGCTGTGCCACCAAGCATTCCTGCTC	3240
AlaAlaGlyProLeuProSerGluAlaValGlnTrpLeuCysHisGlnAlaPheLeuLeu	1080
AAGCTGACTCGACACCGTGTACCTACGTGCCACTCCTGGGGTCACTCAGGACAGCCCAG	3300
LysLeuThrArgHisArgValThrTyrValProLeuLeuGlySerLeuArgThrAlaGln	1100
ACGCAGCTGAGTCGGAAGCTCCCGGGGACGACGCTGACTGCCCTGGAGGCCGAGCCAAC	3360
ThrGlnLeuSerArgLysLeuProGlyThrThrLeuThrAlaLeuGluAlaAlaAlaAsn	1120
CCGGCACTGCCCTCAGACTTCAAGACCATCCTGGAC	3420
ProAlaLeuProSerAspPheLysThrIleLeuAsp	1132

FIG. 11F

[illegible]

**FIG. 11G**

ATGCGCGCGCTCCCCGCTGCCAGCGGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGCTGGCCACGTTCTGTG  
M P R A P R C R A V R S L L R S H T R E V L P L A T F V

R R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A  
 C C C C T C T T C C C C A G G T G T C T G C C T G A A G G A G T G T G G C C G A G T G C T C A G A G G C T G T G C G A G C G G G C G C G A A G A C G T G G C T C T G C G C T G C G C G T G C G A C G G G G C C G  
 P S P R Q V S C L K E L V A T V R L Q C T C E R G A K N V L A P G F A L L D G A R  
 C G G G G C C C C C C G A G G C C T T C A C C A C C A G G T G C G C A G C T A C T G C C A C A C C G T G A C C C T G A C C A C C T G C G G G G A G C G G G C G T G G G G G C T G C T G C T G C G C C G T G G G C G A C A C G T  
 G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L L R R V G D D V  
 G C T G G T T C A C T G C T G C C A C G C T G C G C G C T C T T T G T G C T G T G C T C C A G C T G C C C C T A C C A G T G T G C G G G C C G C C G T T A C C A G C T G C G C G C T G C C A C T C A G G C C C G G C C C C C C C  
 L V H L L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P  
 A C A C G C T A G T G A C C C C A A G C G C T T G G A T G C G A C C G C C T G G A A C A T A G C C T A C G G A G C C G G G C T C C C C T G G G C T G C C A C C C C G G G T G C G A G G A G C C G G G G C C A G T G C  
 R A S G P R R R L G C E R A W N E S V R Z A G V P L G L P A P G A R R R G G S A  
 C A G C C A A G T C T G C C T T G C C A A G A G C C C A G G C T G C G C T G C C C C T G A G C C G A G C G A C C C C C T T G G C A G G G T C T G G G C C A C C C G G C A G A C G C T G A C C G A G T G A C C G  
 S R S L P L P L K R P R R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R  
 T G G T T C T G T G T G T G T C A C T G C C A G A C C C C G A A G A C C A C T C T T T G A G G G T G C C T C T C T G G C A C G C C C A C T C C C A C C C A C C G T G G G C C C C A G C A C C A C G G G G C C C C C  
 G P C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P  
 A T C C A C T C C G C C C A C C A C G T C C C T G G G A C A C G C T T G T C C C C G G T G T A C C C G A C A C A A G C A C T T C C T C T A C T C T C A C G G C A A A G A G A C A G C T G C G G C C C T C C T T C T A C T C A G  
 S T S R P P P R P W D T P C P P V Y A Z T K E P L Y S S G D K E Q L R P S P L L S  
 C T C T C T A G A G C C C A C C T G A C T G G C C T G C G A G G T C T G T G A G A C C A T C T T C T G G G T T C A G G C C C T G G A T C C G G A G C T C C C C G A G G T T G C C C C G C C T G C C C A C G C T A C T G G C A  
 S L P R S L T G G T G A R R L L V E T I F L G S R P L W P P G C G T P R R L P R L P Q R Y W G  
 A A T G C G C C C T G T T T C T G A G C T G C T T G G A A C C A C G C C A G T G C C C T A C G G G T G C T C T A A G A C G C A C T G C C C G T G C G A G C T G C G G T C A C C C A G C A G C C G T G T C T G T G C C G  
 M R P L P L E L L G N H A Q C P Y T V L L K T H C P L R A A V T P A A G V C A R  
 G G A G A G C C C C A G G G C T G T G G C G C C C C C G A G G A G G A G A C A G A C C C C C T G C C T G T G C A G C T G C T C C C C A G C A C A G C A G C C C C T G G C A G G T G T A C G G C T T C T G T G G G C C T G  
 E K P Q G S V A A P E E E S D T D P R R L V Q L L R Q H S S P W Q V Y G P V R A C  
 C C T G C C C G C C T G T G C C C C A G G C C T C T G G G C T C A G G C A C A C G A A C C G C C T C C T C A G G A C A C A A G A G T T C A T C C C T G G G G A A G C A T G C C A A G C T C C G T G C A G A G T  
 L R R L V P P G L W G S R H N E R R P L R N T K K F I S L G K A H A C T L Q E G L  
 G A C G T G G A A G T G A G C C T G C G G A C T G C G C T T G G C T G C C A G G A G C C A G G G T G G C T G T G T G C G G C C A G A C C C T C C T G C G T G A G G A G A C T C T G C C A A G T T C T G C A C T G C C T  
 T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L  
 G A T G A G T G T G A C G T C G T C A G C T G C T C A G G T C T T C T T T A T G T C A C G G A G A C C A C T T C A A A A A A A C A G C C T C T T T T C A C C G A A G A G T G T C T G A G C A A G T T G A A A G C A T T G G  
 M S V Y V V E L L R S P P Y V T Z T T P Q K N R L P P Y R K S V W S K L Q S I G  
 A A T C A G A C A C A C T T G A A G A G G T G C A G C T G C G G A G C T G T C G A A G C A G A G T C A G G C A G C A T C G G A A G C A G G C C C C C C T G C T G A C T C C A G A C T C G G C T T C A T C C C C A A G C C T G A  
 I R Q H L K R V Q L R E L S E A E V R Q E R S A R P A L L T S R L R P I P K P D  
 C G G C T G C G C C G A T T G T G A A C T G G A C T A C G T G T G G G A G C C A G A A C C T C C C C A G A A A A G A G G C C A G C C T C A C C T C G A G G T G A A G G C A C T G T T C A G C G T C A A A C T A G G A  
 G L R P I V N M D Y V V G A T F R R E X R A E R L T S R V K A L F S V L N Y E  
 C G G G C G C G C C C C C C C C C T C T G G G C C C T C T G T G C T G G G C T G G A G A T A T C C A C A G G C C T G C G C A C C T T C G T G C T G C T G T G C G G G C C A G G A C C C G C C C T G A G C T G T A C T T  
 R A R R P G L L G A S V L G L D C I H R A W R T P V L R V R A Q D P P P E L Y P  
 T G T C A A G G T G A T G T G A C G G C C G T A C G A C C A T C C C C C A G G A C A G G C T C A C G A G G T C A T C C C A G C A C T A C A A C C C C A G A A C C G T A C T G C G T G C G T G C G T A G C C G T G C C A  
 V K V D V T G A Y D T I P Q D R L T S V A S I I K P Q N T Y C V R R Y A V V Q  
 G A A G C C C C C C A T G G G C A C T C C G A A G C C T C A A G A C C A C G T C T C T A C T T G A C A C A C T C C A G C C G T A C A T G C G A C A C T C C A C T G C A G G A C C A G C C C G C T G A G G G A  
 K A A H G H V R K A P K S H V S T L T C L Q P Y M R Q P V A H L G E T S P L R D  
 T G C C G T C G T A C T G A C C A G A G C T C C T C C C T G A A T G A G G C A G C A G T G C C T T C S A C G T C T C T C A C G T T C A T G T G C C A C C A C C C C G T G C C A C A G G G C A A G T C C T A C G T C C A G T G  
 A V I E B Q S S S L N E A S S G L T C D V F L R F M C H H A V R I R G K S Y V Q C  
 C C A G G G A T C C C C A G G G C T C C A T C T C T C C A C G C T G C T C T G A G C C T G T G C T A C C G C A C A T G G A A A A G C T G T T G C G G G A T T G C G G G A C G G G C T G C T C C T G C G T T T G T G G A  
 Q G I P Q G S I L S T L L C S L C Y G D M E N K L P A G I R R D G L L L L R L V D  
 T G A T T C T T G T T G T G A C A C C T C A C C T C A C C C A C G G A A A A C C T C C T C A G G A C C C T G T G C A G C T G C C T G A T A T G G C T G C G T G T G A A C T T G C G G A A C A G T G T G A A C T T C C C  
 D F L L L V T P H L T H A K T P L R T L V R G S V P E Y G C V V N L R K T V V N P P  
 T G T A G A A G C A G A G C C C T G G T G G C A C G G C T T T G T T C A G A T C C G G C C C A C G G C C T A T T C C C C T G C G G L L G T T G C T G G A T C C C G A C C T G G A G G T G C A G A C G A C T A C C A G  
 V E D E A L G G T A F V Q M P A H G L P P W C G G L L L D L T R T L E V Q S D Y S S  
 C T A T C C C G A C C T C C A T C A G A C C A G T C T C A C C T T C A C C C G G G C T C A A G G C T G G A G G A A C T G C C T G C A A A C T C T T G G G G T C T T G C G G C T G A A G T C A C A C C T G T T T C T G G A  
 Y A R T S I R A S L T P N R G P K A G R N M R R K L P G V L R L K C H S L P L D  
 T T T G C A G G T G A A C A G C C T C A G A C G G T G T G C A C C A A C A T C T A C A A G A T C C T C C T G C T G C A G G C G T A C A G G T T C A C G C A T G T G T G C A G C T C C C A T T T C A T C A G A A G T T T G G A A G A A  
 L Q V N S L Q T V C T N I Y K I L L L Q A Y R P H A C V L Q L P P H Q Q V W K N  
 C C C C A C A T T T T C T G C G C T C A T C T G A C A C G G C C C C C T C T G C T A C T C C A T C C T G A A A G C C A A G A A C C A G G A T G T G C T G G G G C C A A G G G C C G C C G C C C T C G C C T C C G A  
 P T P P L R V I S D T A S L C Y S I L K A K N A S  
 C C G A A A A A A C A T T T C T G C T G T G A C T C C T G C G G T G C T T G G G T C  
 E N I L V A C T P A V L G S  
 G G G A C C C A G A G A T G G A G C C A C C C C A G A C C C T G G G T G T G G G C A G C T T C C G G T G T C C T G G A G G G A G T T G G G C T G G C C T C C T C A G G C T C T G T T T C C



TGCCGCGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGTGGCCACGTTCTGTG  
P R A P R C R A V R S L L R S H T R E V L P L A T F V

**FIG. 11I**

Truncated protein that lacks motif A

TGCCACAGGGTGCCCCCTCGTCCCATCTGGGGCTGAGCACAAATGCCATCTTTCTGTGGGAGTGAGGGTGCCTCACAAACGGGAGCAGTTTCTGTGCTATTTTGGTAA

**FIG. 11J**

[illegible]

**FIG. 11K**

ATGCCGCGCGCTCCCGCTGCCGAGCGTGGCGTCCCTGCTGCCAGCCACTACCGGAGGTGCTGCCGCTGGCCAGTTCGTG  
 M P R A P R C R A V R S L L R S H T R E V L P L A T F V  
 CGGCGCTGGGGCCCCAGGGCTGGCGCTGGTGAGCGCGGGGACCGCGCGCTTCCCGCGCTGGTGCGCCAGTGCCTGGTGCGTGCCCTGGGACGACCGCGCGCGCGCGCGCG  
 R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A  
 GGCTCCCGGGGTGGCGCTCCGCTGGGTTGAGGGCGCGCGGGGGAACAGCGCATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCGCGCAGGTG  
 G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R P P R R  
 A S P G S A S G W G \* G R P G G T S D M R R A A Q A T Q G A S P A G  
 P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V  
 CCCCTCCTCCCGCAGGTGCTGCTGCTGAAGGAGCTGGTGGCGGAGTGTGCGAGGCTGTGCGAGCGCGCGGGAAGAACGTGCTGGCTTCCGCTTCCGCTGCTGGACGGGGCGCG  
 P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R  
 CGGGGCGCGCGCGGAGGCTTCAACACAGCGTGGCGAGTACCTGCCCAACCGGTGACCGACCGCACTCGGGGGAGCGGGCGTGGGGCTGCTGCTGCCCGCGTGGCGACGACGT  
 G G P P E A P T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V  
 GCTGGTTCACCTGCTGGCAGCGTGGCGCTCTTTGTGCTGGTGGTCCCGAGTGGCGCTACAGGTGTGGGGCGCGCGGTGTACAGCTCGGCGCTGCCACTCAGGCGCGCGCGCGCGCG  
 L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P  
 ACAGCTAGTGACCCCGAAGCGTCTGGGATGCGAAGCGGCTGGAACCATAGCGTCAGGAGGCGCGGGTCCCGCTGGCGCTGCCAGCGCGGGTGGAGGAGGCGGGGGCAGTGC  
 H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R R G G S A  
 CAGCGGAAGTCTGCGCTTCCCAAGAGCGCCAGGCGTGGCGCTGCCCTGAGCGCGGAGCGAGCGCGCTTGGGAGGGGTCTGGGCGCCACCGCGGAGGACGCGTGGACGAGTGAACCG  
 S R S L P L P K R P R G A A P E B T P V G Q G S W A H P G R T R G P S D R  
 TGGTTCGTGCTGGTGTACCTGCCAGACCGCGGAAGCGCACCTCTTTGGAGGGTGGCTCTCTGCGACGCGCCACTCCCAACCATCGTGGCGCGCGAGCACCAGCGGGCGCGCGCG  
 G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P  
 ATCCACATCGCGCGCACCGCTGCTGGGACAGCGCTTGTCCCGCGGTGTACCGCGAGCAAGCACTTCTCTACTCTCTCAGGCGACAAGGAGCAGCTGCGCGCCCTCTCTCTACTCAG  
 S T S R P P R P W D T P C P P V Y A S T K H P L Y S S G D K E Q L R P S P L L S  
 CTCTGAGGCGCGAGCTGACTGGCGCTGGAGGCTCGTGAGACCATCTTTCTGGGTTCAGGCGCTGGATGCCAGGAGTCCCGCGAGGTGCGCGCGCTGCCCGAGCGCTACTGGCA  
 S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q  
 AATGCGCGCGCTGTCTTGGAGCTGCTTGGGAACACGCGCAGTGCCCTACGGGGTCTCTCAAGACGCACTGCGCGCTGGAGCTGGGTACCGCGAGCGCGGTGTCTGTGCGCG  
 M R P L P L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R  
 GGAGAAGCGCGAGGCTGTGCGCGCGCGCGGAGGAGGACACAGACCGCGCTGGTGGAGCTGCTCGCGCAGCACAGGCGCGCTGGCAGGTGTACGGCTTCTGTGCGCGCTG  
 E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C  
 CCTGCGCGCGCTGGTGGCGCGCGCGAGGCTTGGGGCTCAGGCAACGAAGCGCGCTTCTCAGGAACACGAAGTTTCTCTCTGGGAAGCATGCCAAGCTCTCGTGCAGGAGCT  
 L R R L V P P G L W G S R H N E R R P L R N T K K P I S L G K H A K L S L Q E L  
 GACGTGAAGATGAGCTGCGCGGACTGCGCTGGCTGCGCAGGAGCGCGGGGTGGCTGTCTCGCGCGCAGAGCACCGCTGCGTGGAGGAGATCTGGCCAAAGTTCTGTCACTGGCT  
 T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L  
 GATGAGTGTGTACGCTCGAGCTGCTCAGGTCTTTCTTTATGTACCGAGACCTCTTTCAAAGAAGAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATTTGG  
 M S V Y V V E L L R S P P Y V T S T T P Q K N R L P P Y R K S V W S K L Q S I G  
 AAT - NNN - GACAGTCAACAGGGGGTTGACCGCGGACTGGCGCTCCCGAGGTGACTATAGGACAGGTGTCCAGGTGCCCTGCAAGTAGAGGGGCTCTCAGAGGCGTCTGGCTGG  
 CATGGGTGAGCTGCGCGCGCGCATGGCTTCTGCGTGTGCTGCCGTGGGTGCCCTGAGCGCTCACTGAGTGGGTGGGGCTTGTGGCTTCCCGTGAGCTTCCCGCTAGTCTGTGTCTG  
 GCTGAGCAAGCTCTCGAGGGCTCTCTATTG.

FIG. 11L

# Truncated protein 1 (ver.

ATGCCCGCGCTCCCGCTGCCGAGCGGTGCCCTCCCTGCTGCCAGCCACTACCGGAGGTGTCGCGCTGGCCAGCTTCGTG  
M P R A P R C R A V R S L L R S H T R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGCAGCGCGGGGACCGCGGGCTTTCGCGCGCTGGTGGCCAGTGCCTGGTGTGCGTGGCCCTGGGAGCGACCGCGCGCCCCCGCGG  
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCGGGTCCGCTCCGCTCGGCTGGGTTGAGGGGCGCGCGGGGAAACAGCGACATGCGGAGAGCAGCGCAGCGGACTCAGGGCGCTTCCCGCGCAGGTG  
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R P P R R  
A S P G S A S G W G \* G R P G G T S D M R R A A Q A T Q G A S P A G  
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTCCCGCAGGTGTCTGCTGAAGGAGCTGGTGGCCGAGTGTCTGAGAGGCTGTGCGAGCGCGCGCGAAGAACGTGCTGGCCTTCGCGCTTCGCGCTGCTGGACGGGGCCCCG  
P S P R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTCCACCACGAGCTGCGCAGCTACCTGCCCAACAGGTGACCGACGCACTCGGGGGAGCGGGCGTGGGGGCTGCTGCTGCGCGCGCTGGGCGAGCAGCT  
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGTTTACCTGCTGGCAGCTGCGCGCTCTTGTGCTGGTGGCTCCAGCTGCGGCTTACAGGTGTGGGGCGCGCGCTGTACAGCTCGGGCGCTGCCACTCAGGCGCGCGCGCGCGC  
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACAGCTAGTGGACCCCGAAGCGCTGTGGATGCGAACCGGCTGGAAACATAGCTCAGGGAGCGCGGGTCCCGCTGGGCTGCCAGCGCGCGGTGCCAGGAGCGCGGGGCGAGTGC  
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCGCTGCCAAGAGCGCGAGCGTGGCGCTGCCCTGAGCGCGAGCGGACGCGCGTGGGCGAGGGTCTGGGCGCAACCGGGCAGGACGCTGGACGAGTGAACG  
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTCTACCTGCCAGACCGCGCGAAGAGCGCCTCTTTCGAGGGTGGCTCTCTGCGACGCGCGCACTCCCACTCCCTGCGCGCGCGCAGCAGCGCGCGCGCGC  
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGCGCACCGTCCCTGGGACCGCTTGTCCCGCGGTGTACCGCGAGACCAAGCACTTCTCTACTCTCAGGCGCAAGGAGCAGCTCGCGCGCTCTCTCTACTCAG  
S T S R P P R P W D T P C P P V Y A E T K H P L Y S S G D K E Q L R P S P L L S

CTCTCTGAGGGCCAGCTGACTGCGCGCTCGGAGGCTCGTGAGACCATCTTCTGGGTTCCAGGCGCTGGATGCGAGGACTCCCGCGAGGTGCGCGCGCTGCCCGAGCGCTACTGGCA  
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGCGCGCTGTTCTGAGCTGCTTGGGAACACCGCGAGTGGCGCTACGGGGTCTCTCAAGACGCACTGCGCGCTGCGAGCTGCGGTCACCCCAGCAGCGCGGTGTCTGTGCGCG  
M R P L P L S L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

CGAGAAGCCCCAGGCTCTGTGCGCGCGCGCGAGGAGGACACAGACCGCGCTGCGCTGGTGCAGCTGCTCCGCGAGCACAGCAGCGCTGGCAGGTGTACGGCTTGTGCGCGCGCTG  
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G P V R A C

CCTGCGCGCGCTGTTGCCCGCGCGCTGGGGCTCCAGGCAACAGAACCGCGCTTCTCAGGAACACCAAGAGTTCATCTCCCTGGGGAAGCATGCCAAGCTCTCGCTGCGAGGCT  
L R R L V P P G L W G S R H N E R R P L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCGTGGCGACTCGCTTGGCTGCGCAGGAGCGCGGGTGGCTGTGTTCGCGCGCAGAGCACCGTCTGCGTGAGGAGATCTCGGCGAAGTTCCTGCACTGGCT  
T W K H S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTCTGAGCTGCTCAGGTCTTCTTTATGTACCGGAGACCACTTTCAAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTCGAAAGCATTGG  
M S V Y V V E L L R S F F Y V T E T T F Q K N R L P P Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGGTGCGCTGCGGGAGCTGTGGAAGCAGAGTCAAGGACCATCGGGAAGCGCGCGCGCTGCTGAGCTCCAGACTCCGCTTCATCCCAAGCTGA  
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R P I P K P D

GTGGCTGTGCTTTGGTTTAACTTCCTTTTAAACAGAA  
V A V L W F T F L P N Q K

CGGGCTCGCGCGATTGTGAACATGACTACGTCTGGGAGCGAGAACCTTCCGAGAGAAAAGAGGGCGGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTCAAGCTGCTCAACTACGA  
G L R P I V N M D Y V V G A R T P R R E K R P S V S P R G \*

FIG. 11M

truncated protein 2 (ver. 1.0)

CCAGGGGATCCCGCAGGGCTCCATCTCTCCACCGCTGCTCTGCAGCCTGTGCTACCGCGACATGGAGAAACAAGCTGTTTGGCGGGGATTGGCGGGGACGGGCTGCTCCTGCGTTTGGTGGAA  
P G D P A G L H P L H A A L Q P V L R R E G E Q A V C G D S A G R A A P A P V G

TGATTCTCTGTGGTGACACCTCACCTCACCGCGGAAAACTTCTCTCAGGACCGCTGCTCGAGTGTCCTTGAGTAGTGGCTGCGTGGTGAACATTGGCGGAAGACAGTGGTGAACCTCCCG

[illegible]

ATGCCGCGCTCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAG	60
MetProArgAlaProArgCysArgAlaValArgSerLeuLeuArgSerHisTyrArgGlu	20
GTGCTGCCGCTGGCCACGTTTCGTGCGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGCAG	120
ValLeuProLeuAlaThrPheValArgArgLeuGlyProGlnGlyTrpArgLeuValGln	40
CGCGGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCAGTGCCTGGTGTGCGTGCCCTGG	180
ArgGlyAspProAlaAlaPheArgAlaLeuValAlaGlnCysLeuValCysValProTrp	60
GACGCACGGCCGCCCCCGCGCCCCCTCCTTCGCCAGGTG	
AspAlaArgProProProAlaAlaProSerPheArgGlnVal	
GGCCTCCCCGGGTGCGCGTCCGCTGGGGTTGAGGGCGCGGGGGGAACAGCGACATCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG	
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R	
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G	
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V	
TCCTGCCTGAAGGAGCTG	240
SerCysLeuLysGluLeu	80
GTGGCCCCGAGTGCTGCAGAGGCTGTGCGAGCGCGCGCGAAGAACGTGCTGGCCTTCGGC	300
ValAlaArgValLeuGlnArgLeuCysGluArgGlyAlaLysAsnValLeuAlaPheGly	100
TTGCGCTGCTGGACGGGGCCCGCGGGGGCCCCCGAGGCCCTTACCACCAGCGTGCGC	360
PheAlaLeuLeuAspGlyAlaArgGlyGlyProProGluAlaPheThrThrSerValArg	120
AGCTACCTGCCAACACGGTGACCGACGCACTGCGGGGAGCGGGCGTGGGGGCTGCTG	420
SerTyrLeuProAsnThrValThrAspAlaLeuArgGlySerGlyAlaTrpGlyLeuLeu	140
TTGCGCCGCTGGGCGACGACGTGCTGGTTACCTGCTGGCACGCTGCGCGCTCTTTGTG	480
LeuArgArgValGlyAspAspValLeuValHisLeuLeuAlaArgCysAlaLeuPheVal	160
CTGGTGGCTCCCAGCTGCGCCTACCAGGTGTGCGGGCCGCGCTGTACCAGCTCGGCGCT	540
LeuValAlaProSerCysAlaTyrGlnValCysGlyProProLeuTyrGlnLeuGlyAla	180
GCCACTCAGGCCCCGGCCCCCGCCACACGCTAGTGGACCCCGAAGCGCTCTGGGATGCGAA	600
AlaThrGlnAlaArgProProProHisAlaSerGlyProArgArgArgLeuGlyCysGlu	200
CGGGCCTGGAACCATAGCGTCAGGGAGGCGGGGTCCCCCTGGGCCTGCCAGCCCCGGGT	660
ArgAlaTrpAsnHisSerValArgGluAlaGlyValProLeuGlyLeuProAlaProGly	220
GCGAGGAGGCGCGGGGCGAGTGCCAGCCGAAGTCTGCCGTTGCCCAAGAGGCCAGGCGT	720
AlaArgArgArgGlyGlySerAlaSerArgSerLeuProLeuProLysArgProArgArg	240
GGCGCTGCCCCTGAGCCGGAGCGGACCCGTTGGGCAGGGGTCCTGGGCCCCACCCGGGC	780
GlyAlaAlaProGluProGluArgThrProValGlyGlnGlySerTrpAlaHisProGly	260
AGGACGCGTGACCGAGTGACCGTGGTTTCTGTGTGGTGTACCTGCCAGACCCGCCGAA	840
ArgThrArgGlyProSerAspArgGlyPheCysValValSerProAlaArgProAlaGlu	280
GAAGCCACCTCTTTGGAGGGTGCGCTCTCTGGCACGCGCCACTCCCACCCATCCGTGGGC	900
GluAlaThrSerLeuGluGlyAlaLeuSerGlyThrArgHisSerHisProSerValGly	300
CGCCAGCACCACGCGGGCCCCCATCCACATCGCGGCCACCACGTCCCTGGGACACGCCT	960
ArgGlnHisHisAlaGlyProProSerThrSerArgProProArgProTrpAspThrPro	320
TGTCCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCCTCAGGCGACAAGGAGCAG	1020
CysProProValTyrAlaGluThrLysHisPheLeuTyrSerSerGlyAspLysGluGln	340
CTGCGGCCCTCCTTCTACTCAGCTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTC	1080
LeuArgProSerPheLeuLeuSerSerLeuArgProSerLeuThrGlyAlaArgArgLeu	360
GTGGAGACCATCTTTCTGGGTTCAGGCCCTGGATGCCAGGGACTCCCCGAGGTTGCCC	1140
ValGluThrIlePheLeuGlySerArgProTrpMetProGlyThrProArgArgLeuPro	380
CGCCTGCCCCAGCGCTACTGGCAAATGCGGCCCTGTTTCTGGAGCTGCTGGGAACCAC	1200

FIG. 110

ArgLeuProGlnArgTyrTrpGlnMet	roLeuPheLeuGluLeuLeuGlyAsnHis	
GCGCAGTGCCCCCTACGGGGTGCTCCTCAAGACGCACTGCCCGCTGCCAGCTGCGGTCAACC		1260
AlaGlnCysProTyrGlyValLeuLeuLysThrHisCysProLeuArgAlaAlaValThr		420
CCAGCAGCCGGTGTCTGTGCCCCGGAGAAGCCCCAGGGCTCTGTGGCGGCCCCGAGGAG		1320
ProAlaAlaGlyValCysAlaArgGluLysProGlnGlySerValAlaAlaProGluGlu		440
GAGGACACAGACCCCCGTGCGCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCCCTGGCAG		1380
GluAspThrAspProArgArgLeuValGlnLeuLeuArgGlnHisSerSerProTrpGln		460
GTGTACGGCTTCGTGCGGGCCTGCCTGCGCCGGCTGGTCCCCCAGGCCTCTGGGGCTCC		1440
ValTyrGlyPheValArgAlaCysLeuArgArgLeuValProProGlyLeuTrpGlySer		480
AGGCACAACGAACGCCGCTTCCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCAT		1500
ArgHisAsnGluArgArgPheLeuArgAsnThrLysLysPheIleSerLeuGlyLysHis		500
GCCAAGCTCTCGCTGCAGGAGCTGACGTGGAAGATGAGCGTGCGGGGCTGCGCTTGGCTG		1560
AlaLysLeuSerLeuGlnGluLeuThrTrpLysMetSerValArgAspCysAlaTrpLeu		520
CGCAGGAGCCCAGGGGTGGCTGTGTTCCGGCCGAGAGCACCGTCTGCGTGAGGAGATC		1620
ArgArgSerProGlyValGlyCysValProAlaAlaGluHisArgLeuArgGluGluIle		540
CTGGCCAAGTTCCTGCACTGGCTGATGAGTGTGTACGTGCTGAGCTGCTCAGGTCTTTC		1680
LeuAlaLysPheLeuHisTrpLeuMetSerValTyrValValGluLeuLeuArgSerPhe		560
TTTTATGTCACGGAGACCACGTTTCAAAGAAGAGGCTCTTTTCTACCGAAGAGTGTC		1740
PheTyrValThrGluThrThrPheGlnLysAsnArgLeuPhePheTyrArgLysSerVal		580
TGGAGCAAGTTGCAAAGCATTGGAATCAGACAGCACTTGAAGAGGGTGAGCTGCGGGAG		1800
TrpSerLysLeuGlnSerIleGlyIleArgGlnHisLeuLysArgValGlnLeuArgGlu		600
CTGTGCGAAGCAGAGGTCAGGCAGCATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGA		1860
LeuSerGluAlaGluValArgGlnHisArgGluAlaArgProAlaLeuLeuThrSerArg		620
CTCCGCTTCATCCCCAAGCCTGACGGGGCTGCGGCCGATTGTGAACATGGACTACGTGCTG		1920
LeuArgPheIleProLysProAspGlyLeuArgProIleValAsnMetAspTyrValVal		640
GGAGCCAGAACGTTCCCGCAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCA		1980
GlyAlaArgThrPheArgArgGluLysArgAlaGluArgLeuThrSerArgValLysAla		660
CTGTTACAGCTGCTCAACTACGAGCGGGCGGGCGCCCCGGCCTCTGGGGCCCTCTGTG		2040
LeuPheSerValLeuAsnTyrGluArgAlaArgArgProGlyLeuLeuGlyAlaSerVal		680
CTGGGCCTGGACGATATCCACAGGGCCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCAG		2100
LeuGlyLeuAspAspIleHisArgAlaTrpArgThrPheValLeuArgValArgAlaGln		700
GACCCGCCCGCTGAGCTGTACTTTGTCAAGGTGGATGTGACGGGCGCGTACGACACCATC		2160
AspProProProGluLeuTyrPheValLysValAspValThrGlyAlaTyrAspThrIle		720
CCCCAGGACAGGCTCACGGAGGTCATCGCCAGCATCATCAAACCCAGAACACGTACTGC		2220
ProGlnAspArgLeuThrGluValIleAlaSerIleIleLysProGlnAsnThrTyrCys		740
GTGCGTCGGTATGCCGTGGTCCAGAAGGCCGCCATGGGCACGTCCGCAAGGCCTTCAAG		2280
ValArgArgTyrAlaValValGlnLysAlaAlaHisGlyHisValArgLysAlaPheLys		760
AGCCACGTCTCTACCTTGACAGACCTCCAGCCGTACATGCGACAGTTCTGTGGCTCACCTG		2340
SerHisValSerThrLeuThrAspLeuGlnProTyrMetArgGlnPheValAlaHisLeu		780
CAGGAGACCAGCCCGCTGAGGGATGCCGTGCTCATCGAGCAGAGCTCCTCCCTGAATGAG		2400
GlnGluThrSerProLeuArgAspAlaValValIleGluGlnSerSerSerLeuAsnGlu		800
GCCAGCAGTGGCCTCTTCGACGTCTTCTACGCTTCATGTGCCACCACGCCGTGCGCATC		2460
AlaSerSerGlyLeuPheAspValPheLeuArgPheMetCysHisHisAlaValArgIle		820
AGGGGCAAGTCTTACGTCCAGTGCCAGGGGATCCCGCAGGGCTCCATCCTCTCCACGCTG		2520
ArgGlyLysSerTyrValGlnCysGlnGlyIleProGlnGlySerIleLeuSerThrLeu		840
CTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGCGGGGATTTCGGCGGGAC		2580

FIG. 11P



LeuCysSerLeuCysTyrGlyAspMet	2640
GGGCTGCTCCTGCGTTTGGTGGATGATTCTTGTGGTGACACCTCACCTCACCCACGCG	880
GlyLeuLeuLeuArgLeuValAspAspPheLeuLeuValThrProHisLeuThrHisAla	
AAAACCTTCCTCAGGACCCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAACCTG	2700
LysThrPheLeuArgThrLeuValArgGlyValProGluTyrGlyCysValValAsnLeu	900
CGGAAGACAGTGGTGAACCTCCCTGTAGAAGACGAGGCCCTGGGTGGCACGGCTTTTGT	2760
ArgLysThrValValAsnPheProValGluAspGluAlaLeuGlyGlyThrAlaPheVal	920
CAGATGCCGGCCACGGCCTATTCCTGGTGCGGCCTGCTGCTGGATACCCGACCCTG	2820
GlnMetProAlaHisGlyLeuPheProTrpCysGlyLeuLeuLeuAspThrArgThrLeu	940
GAGGTGCAGAGCGACTACTCCAGCTATGCCCGGACCTCCATCAGAGCCAGTCTCACCTTC	2880
GluValGlnSerAspTyrSerSerTyrAlaArgThrSerIleArgAlaSerLeuThrPhe	960
AACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGCAAACTCTTTGGGTCTTGCGGCTG	2940
AsnArgGlyPheLysAlaGlyArgAsnMetArgArgLysLeuPheGlyValLeuArgLeu	980
AAGTGTACAGCCTGTTTCTGGATTTCAGGTGAACAGCCTCCAGACGGTGTGCACCAAC	3000
LysCysHisSerLeuPheLeuAspLeuGlnValAsnSerLeuGlnThrValCysThrAsn	1000
ATCTACAAGATCCTCCTGCTGCAGGCGTACAGGTTTCACGCATGTGTGCTGCAGCTCCCA	3060
IleTyrLysIleLeuLeuLeuGlnAlaTyrArgPheHisAlaCysValLeuGlnLeuPro	1020
TTTCATCAGCAAGTTTGAAGAACCCACATTTTCTGCGCGTCATCTCTGACACGGCC	3120
PheHisGlnGlnValTrpLysAsnProThrPhePheLeuArgValIleSerAspThrAls	1040
TCCCTCTGCTACTCCATCCTGAAAGCCAAGAACGCAGGGATGTCGCTGGGGGCCAAGGGC	3180
SerLeuCysTyrSerIleLeuLysAlaLysAsnAlaGlyMetSerLeuGlyAlaLysGly	1060
GCCGCCGGCCCTCTGCCCTCCGAGGCCGTGCAGTGGCTGTGCCACCAAGCATTCTGCTC	3240
AlaAlaGlyProLeuProSerGluAlaValGlnTrpLeuCysHisGlnAlaPheLeuLeu	1080
AAGCTGACTCGACACCGTGTACCTACGTGCCACTCCTGGGGTCACTCAGGACAGCCCAG	3300
LysLeuThrArgHisArgValThrTyrValProLeuLeuGlySerLeuArgThrAlaGln	1100
ACGCAGCTGAGTCGGAAGCTCCCGGGGACGAGCTGACTGCCCTGGAGGCCGAGCCAAC	3360
ThrGlnLeuSerArgLysLeuProGlyThrThrLeuThrAlaLeuGluAlaAlaAlaAsn	1120
CCGGCACTGCCCTCAGACTTCAAGACCATCCTGGAC	3420
ProAlaLeuProSerAspPheLysThrIleLeuAsp	1132

FIG. 11Q

Truncated protein 3 (ver.

**FIG. 11R**

CCGAAGAAAACATTTCTGTCGTGACTCCTGCGGTGCTTGGGTC  
E E N I L V V T P A V L G S

**FIG. 11S**

**FIG. 11T**

[illegible]

1

Truncated protein that lacks motif (ver. 2)

**FIG. 11V**

**FIG. 11W**

He La  
06/11/00  
15/12/05

6m 42.968  
1:10 10:10

01:10  
01:10  
01:10

DATE 01:7  
PAGE 2461-0055

01:1 001:1  
01:1 001:1  
01:1 001:1

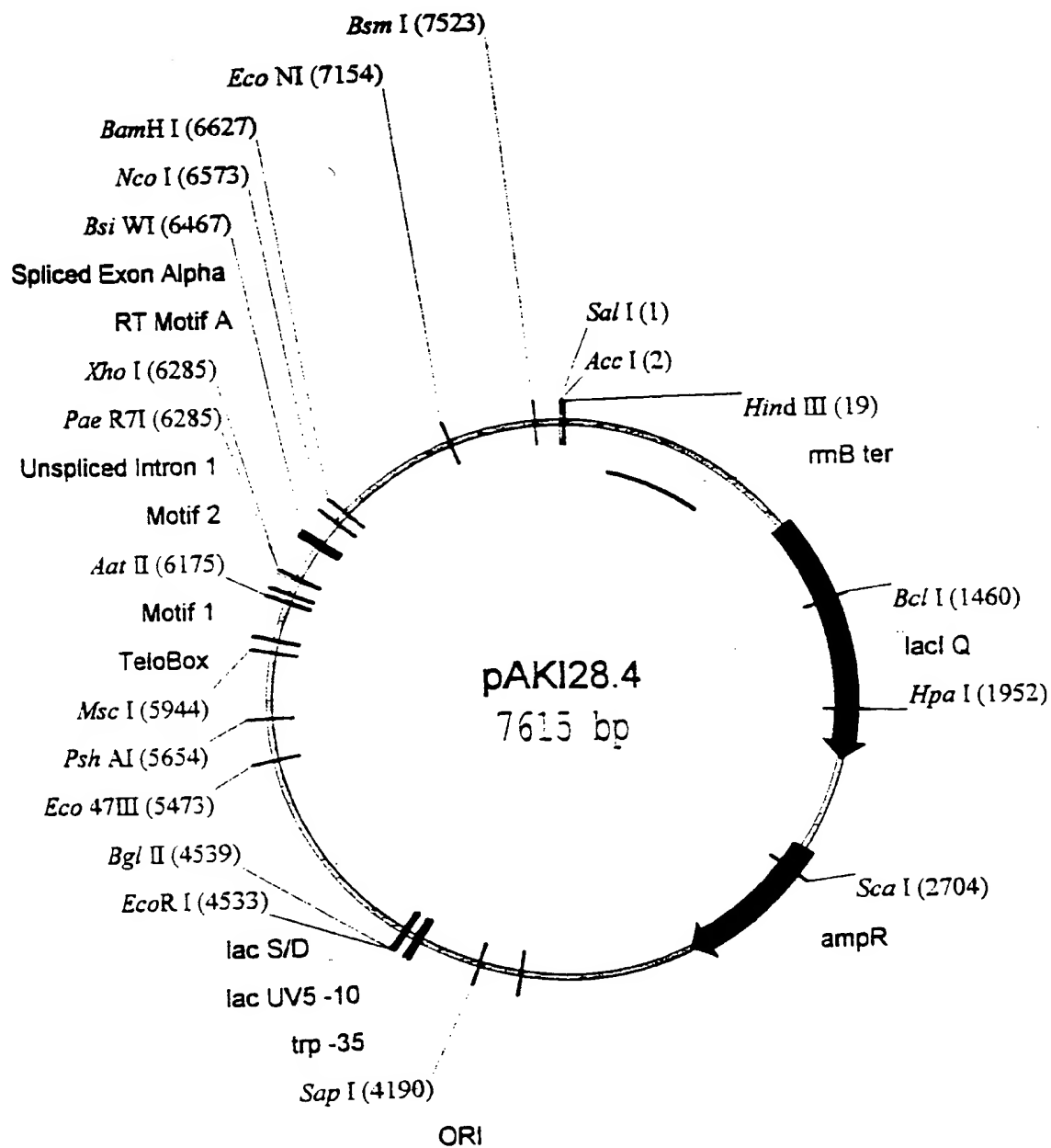
100-3517

Let + \*

长个儿

**FIG. 12**





**FIG. 13A**

LOCUS        pAKI28.4        7615 bp dsDNA        Circular  
DEFINITION   Human telomerase clone with exon beta spliced out

1 tcgacctgca ggcattgcaag cttggcactg gccgtcgttt tacaacgtcg tgactgggaa  
61 aaccctggcg ttacccaact taatcgccct gcagcacatc cccctttcgc cagctggcgt  
121 aatagcgaag agggccgcac cgatcgccct tcccaacagt tgcgcagcct gaatggcgaa  
181 tggcgccctga tgcggtatct tctccttacg catctgtgcg gtatttcaca ccgcataaat  
241 tccctgtttt ggccgatgag agaagatttt cagcctgata cagattaaat cagaacgcag  
301 aagcggctctg ataaaacaga atttgcctgg cggcagtagc gcggtgggtcc cacctgacct  
361 catgccgaac tcagaagtga aacgccgtag cgccgatggt agtgtggggt ctcccatgct  
421 gagagtaggg aactgccagg catcaaataa aacgaaaggc tcagtcgaaa gactgggcct  
481 ttcgttttat ctgttggttg tcggtgaacg ctctcctgag taggacaaat ccgccgggag  
541 cggatttgaa cgttgcgaag caacggcccg gaggggtggcg ggcaggacgc ccgccataaa  
601 ctgccaggca tcaaattaag cagaaggcca tcctgacgga tggccttttt gcgtttctac  
661 aaactcttcc tgctcgtcata tctacaagcc atccccccac agatacggta aactagcctc  
721 gtttttgcac caggaaagca gggaaatttat ggtgcactct cagtacaatc tgctctgatg  
781 ccgcatagtt aagccagccc cgacaccgac caacaccgac tgacgcgccc tgacgggctt

**FIG. 13B**

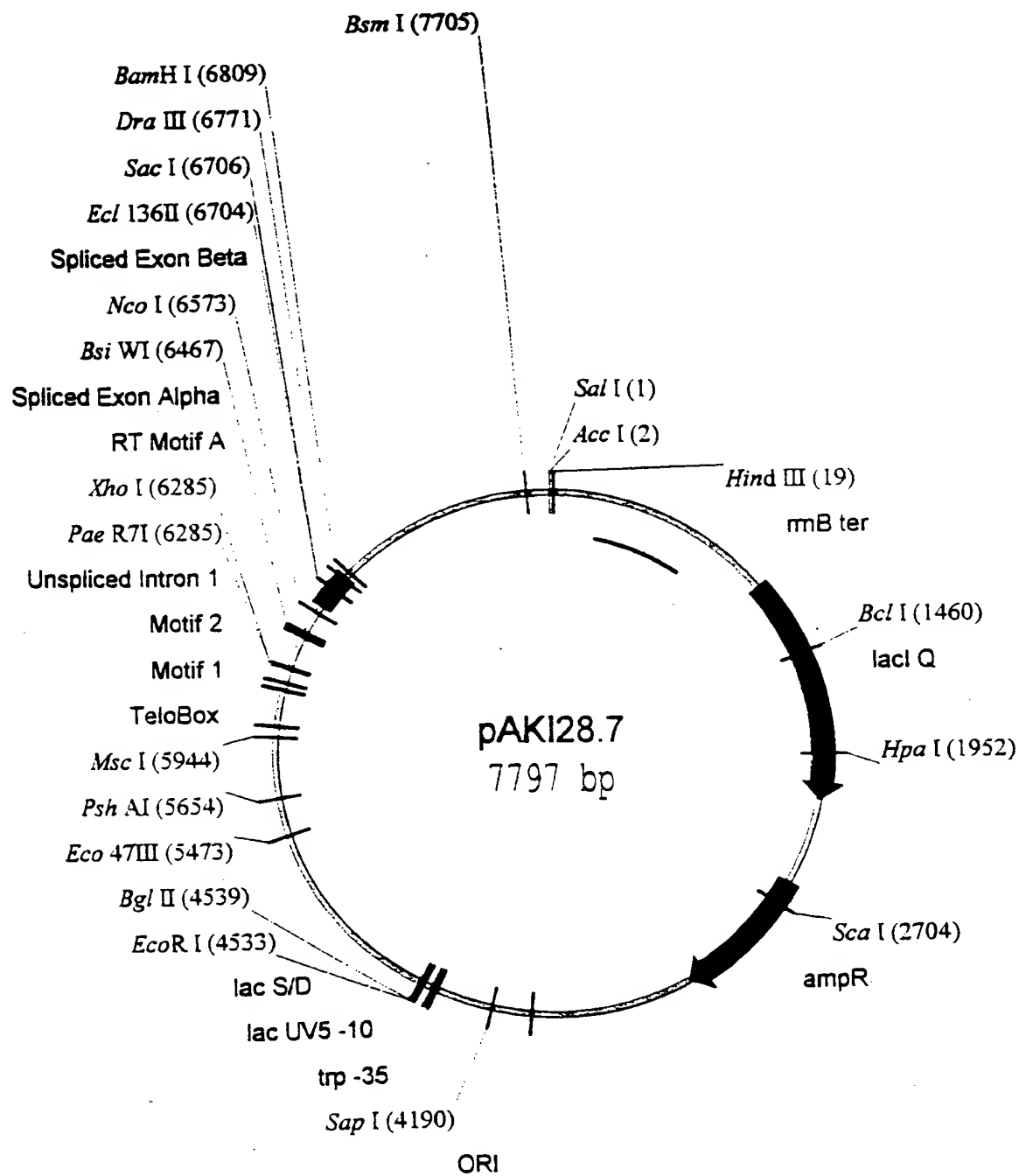
841	gtctgtctccc	ggcatccgct	tacagacaag	ctgtgaccgt	ctccgggagc	tgcattgtgtc
901	agagggttttc	accgtcatca	ccgaaacgcg	cgagacgaaa	gggcctcgtg	atagccttat
961	ttttataggt	taatgtcatg	ataataatgg	tttcttagac	gtgaggttct	gtacccgaca
1021	ccatcgaatg	gtgcaaaacc	tttcgcggtg	tggcatgata	gcgcccggaa	gagagtcaat
1081	tcagggtggt	gaatgtgaaa	ccagtaacgt	tatacgatgt	cgagaggtat	gccgggtgtct
1141	cttatcagac	cgtttcccgc	gtggtgaacc	aggccagcca	cgtttctgcg	aaaacgcggg
1201	aaaaagtgga	agcggcgatg	gcggagctga	attacattcc	caaccgcgtg	gcacaacaac
1261	tggcgggcaa	acagtcgttg	ctgattggcg	ttgccacctc	cagtctggcc	ctgcacgcgc
1321	cgtcgcaaat	tgtcgcggcg	attaaatctc	gcgcgatca	actgggtgcc	agcgtggtgg
1381	tgtcgatggt	agaacgaagc	ggcgtcgaag	cctgtaaagc	ggcgggtgcac	aatcttctcg
1441	cgcaacgcgt	cagtgggctg	atcattaact	atccgctgga	tgaccaggat	gccattgctg
1501	tggaagctgc	ctgcactaat	gttccggcgt	tatttcttga	tgtctctgac	cagacacca
1561	tcaacagtat	tattttctcc	catgaagacg	gtacgcgact	ggcggtggag	catctggtcg
1621	cattgggtca	ccagcaaatc	gcgctggttag	cgggccatt	aagtctgtgc	tcggcgcgctc
1681	tgcgtctggc	tggctggcat	aaatatctca	ctcgcaatca	aattcagccg	atagcggaac
1741	gggaaggcga	ctggagtggc	atgtccgggt	ttcaacaaac	catgcaaatg	ctgaatgagg
1801	gcactgttcc	cactgcgatg	ctggttgcca	acgatcagat	ggcgctgggc	gcaatgcgcg
1861	ccattaccga	gtccgggctg	cgcttggtg	cgatatctc	ggtagtggga	tacgacgata
1921	ccgaagacag	ctcatgttat	atcccgccgt	taaccaccat	caaacaggat	tttcgcttgc
1981	tggggcgaac	cagcgtggac	cgcttgctgc	aactctctca	gggccaggcg	gtgaagggca
2041	atcagctggt	gcccgtctca	ctggtgaaaa	gaaaaaccac	cctggcgccc	aatacgcaaa
2101	ccgcctctcc	ccgcgcgttg	gccgattcat	taatgcagct	ggcacgacag	gtttcccgac
2161	tggaaagcgg	gcagtgagcg	caacgcaatt	aatgtaagtt	agctcactca	ttaggcaccc
2221	caggctttac	actttatgct	tcggacctgc	aagaacctca	cgtcagggtg	cacttttccg
2281	ggaaatgtgc	gcggaacccc	tatttgttta	tttttctaaa	tacattcaaa	tatgtatccg
2341	ctcatgagac	aataaccttg	ataaatgctt	caataatatt	gaaaaaggaa	gagtatgagt
2401	attcaacatt	tcogtgtcgc	ccctattccc	ttttttgogg	cattttgcct	tcctgttttt
2461	gctcaccag	aaacgctggg	gaaagtaaaa	gatgctgaag	atcagttggg	tgcacgagtg
2521	ggttacatcg	agaactggat	ctcaacagcg	gtaagatcct	tgagagtttt	cgccccgaag
2581	aacgttttcc	aatgatgagc	actttttaaag	ttctgctatg	tggcgcggtg	ttatcccgta
2641	ttgacgcggg	gcaagagcaa	ctcggtcgcc	gcatacacta	ttctcagaat	gacttggttg
2701	agtactcacc	agtcacagaa	aagcatctta	cggtatggcat	gacagtaaga	gaattatgca
2761	gtgctgccat	aacctgagt	gataacactg	cggccaaact	acttctgaca	acgatcggag
2821	gaccgaagga	gctaaccgct	tttttgcaca	acatggggga	tcatgtaact	cgcttgatc
2881	gttgggaacc	ggagctgaat	gaagccatac	caaacgacga	gcgtgacacc	acgatgcctg
2941	tagcaatggc	aacaacgctg	cgcaaaactat	taactggcga	actacttact	ctagcttccc
3001	ggcaacaatt	aatagactgg	atggaggcgg	ataaagttgc	aggaccactt	ctgcgctcgg
3061	cccttccggc	tggctggttt	attgctgata	aatctggagc	cggtgagcgt	gggtctcgcg
3121	gtatcattgc	agcactgggg	ccagatggta	agccctcccc	tatcgtagtt	atctacacga
3181	cggggagtc	ggcaactatg	gatgaacgaa	atagacagat	cgctgagata	ggtgcctcac
3241	tgattaagca	ttggttaactg	tcagaccaag	tttactcata	tatacttttag	attgatttaa
3301	aacttcatth	ttatattaaa	aggatctagg	tgaagatcct	ttttgataat	ctcatgacca
3361	aaatccctta	acgtgagttt	tcgttccact	gagcgtcaga	ccccgtagaa	aagatcaaag
3421	gatcttcttg	agatcccttt	tttctgcgcg	taatctgctg	cttgcaaaaca	aaaaaaccac
3481	cgctaccagc	ggtggtttgt	ttgccggatc	aagagctacc	aactcttttt	ccgaaggtaa
3541	ctggcttcag	cagagcgag	ataccaaata	ctgtccttct	agtgtagccg	tagttaggcc
3601	accacttcaa	gaactctgta	gcaccgccta	catacctcgc	tctgctaata	ctgttaccag
3661	tggctgctgc	cagtggcgat	aagtcgtgtc	ttaccggggt	ggactcaaga	cgatagttac
3721	cggataaggg	gcagcggtcg	ggctgaacgg	ggggttcgtg	cacacagccc	agcttgaggc
3781	gaacgacct	caccgaactg	agatacctac	agcgtgagca	ttgagaaagc	gccacgcttc
3841	ccgaaggagg	aaaggcggac	aggtatccgg	taagcggcag	ggtcggaaca	ggagagcgca
3901	cgaggggagct	tcagggggga	aacgcctggg	atctttatag	tcctgtcggg	tttcgccacc
3961	tctgacttga	gcgtcgatth	ttgtgatgct	cgtcaggggg	gcggagccta	tggaaaaacg
4021	ccagcaacgc	ggcctttttt	cggttccctg	ctttttgctg	gccttttgc	cacatgttct
4081	ttcctgcgtt	atcccttgat	tctgtggata	accgtattac	cgcttttgag	tgagctgata
4141	ccgctcgccg	cagccgaacg	accgagcgca	gcgagtcagt	gagcgaggaa	gcggaagagc
4201	gccaataacg	caaaccgcct	ctccccgcgc	gttggccgat	tcattaatgc	agaattaatt

FIG. 13C

4261 ctcattgtttg acagcttatt atcgactgca cgggtgcacca atgctttctgg cgtcaggcag  
 4321 ccacggaag ctgtggtatg gctgtgcagg tcgtaaatca ctgcataatt cgtgtcgtc  
 4381 aaggcgcaact cccgtttctgg ataattgtttt ttgcgcccag atcataacgg ttctggcaaa  
 4441 tattctgaaa tgagctgttg acaattaatc atcggtctgt ataattgttg gaattgtgag  
 4501 cggataacaa tttcacacag gaaacagcga tgaattcaga tctcaccatg aaggagctgg  
 4561 tggccccgagt gctgcagagg ctgtgcgagc gcggcgcgaa gaacgtgctg gccttcggct  
 4621 tcgcgctgct ggacggggcc cgcgggggcc ccccgaggc cttcaccacc agcgtgcgca  
 4681 gctacctgcc caacacggtg accgacgcac tgcgggggag cggggcggtg gggctgctgc  
 4741 tgcgcccgtt gggcgacgac gtgctggttc acctgctggc acgctgcgct ctctttgtgc  
 4801 tgggtggctcc cagctgcgcc taccaggtgt gcggggccgc gctgtaccag ctgcggcgctg  
 4861 ccactcaggc cgggcccccg ccacacgcta gtggaccccg aaggcgctct ggatgcgaac  
 4921 gggcctggaa ccatagcgct agggagggcg ggggtccccc gggcctgcca gccccgggtg  
 4981 cgaggaggcg cgggggcagt gccagccgaa gtctgccgtt gcccaagagg cccaggcgctg  
 5041 gcgctgcccc tgagccggag cggacgcccg ttgggcaggg gtcctggggc caccggggca  
 5101 ggacgcgtgg accgagtgc cgtggtttct gtgtggtgtc acctgccaga cccgccaag  
 5161 aagccacctc tttggagggt gcgctctctg gcacgcgcca ctccaccca tccgtggggc  
 5221 gccagcacca cgcggggccc ccattccat acgtccctgg gacacgcctt  
 5281 gtcccccggt gtacgcccag accaagcac tccctactc ctcaggcgac aaggagcagc  
 5341 tgcggccctc cttccctact agctctctga ggcccagcct gactggcgct cggaggctcg  
 5401 tggagaccat cttctgtggg tccaggccct ggatgccagg gactccccgc aggttgcccc  
 5461 gcctgcccc aagcctactg caaatgcggc cctgtttct ggagctgctt gggaaccacg  
 5521 cgcagtggcc ctacgggggt cctccaaaga cgcactgcc gctgcgagct gcggtcacc  
 5581 cagcagccgg tgtctgtgcc cgggagaagc cccagggtc tgtggcgccc cccgaggagg  
 5641 aggacacaga cccccgtcgc ctggtgcagc tgctccgcca gcacagcagc cctggcagg  
 5701 tgtacggctt cgtgcggggc tgccctgcgc ggtggtgccc cccaggcctc tggggctcca  
 5761 ggcacaacga acgcccgttc ctcaggaaac caaagaagt catctccctg gggaagcatg  
 5821 ccaagctctc gctgcaggag ctgacgtgga agatgagcgt gcgggactgc gcttggctgc  
 5881 gcaggagccc aggggttggc tgtgttccgg ccgcagagca ccgtctgcgt gaggagatcc  
 5941 tggccaagt cctgcactgg ctgatgagtg tgtacgtcgt cgagctgctc aggtctttct  
 6001 tttatgtcac ggagaccacg tttcaaaaga acaggctctt tttctaccgg aagagtgtct  
 6061 ggagcaagt gcaaagcat ggaatcagac agcacttgaa gagggtgcag ctgcgggagc  
 6121 tgtcggaagc agaggtcagg cagcatcggg aagccaggcc cgccttgcct acgtccagac  
 6181 tccgcttcat ccccaagcct gacgggctgc ggccgattgt gaacatggac tacgtcgtgg  
 6241 gagccagaa gttccgcaga gaaaagagg ccgagcgtct caccctcagg gtgaaggcac  
 6301 tgttcagcgt gctcaactac gacggggcgc ggcgccccgg cctcctgggc gcctctgtgc  
 6361 tgggcctgga cgatatccac agggccttgc gcacctcgt gctgcgtgtg cgggcccagg  
 6421 acccgccgcc tgagctgtac tttgtcaagg tggatgtgac gggcgctac gacaccatcc  
 6481 cccaggacag gctcacggag gtcacgcca gcatcatcaa accccagaac acgtactgcg  
 6541 tgcgtcggtg tgcggtggtc cagaaggccg cccatgggca cgtccgcaag gccttcaaga  
 6601 gccacgtcct acgtccagt ccaggggat ccgcagggt ccatcctctc cacgctgctc  
 6661 tgcagcctgt gctacggcga catggagaac aagctgtttg cggggattcg gcgggacggg  
 6721 ctgctcctgc gtttgggtga tgatttcttg ttggtgacac ctacacctac ccacgcgaaa  
 6781 acttccctcag gacctgggtc gaagtgtctt gagtatggt gcgtggtgaa cttgcggaag  
 6841 acagtgtgtg acttccctgt agaagacgaa gccctgggtg gcacggcttt tgttcagatg  
 6901 ccggccccacg gcctattccc ctggtgcggc ctgctgctgg ataccggag cctggagggtg  
 6961 cagagcgact actccagcta tgcccggacc tccatcagag ccagtctcac cttcaaccgc  
 7021 ggcttcaagg ctgggaggaa catgctgctg aaactctttg gggctctgct gctgaagtgt  
 7081 cacagcctgt ttctggattt gcagggtgaa agcctccaga cgggtgtgcac caacatctac  
 7141 aagatcctcc tgctgcaggc gtacagggtt cacgcatgtg tgctgcagct cccatttcat  
 7201 cagcaagttt ggaagaaccc cacatttttc ctgcgcgtca tctctgacac ggcctccctc  
 7261 tgctactcca tccgaaagc caagaacgca gccgaagaaa acatttctgt cgtgactcct  
 7321 gcggtgcttg ggtcgggaca gccagagatg gagccacccc gcagaccgtc ggggtgtgggc  
 7381 agctttccgg tgtctcctgg gaggggagt gggtggggc tgtgactcct cagcctctgt  
 7441 tttccccacg ggatgtcgt gggggccaag ggcgcccgc gccctctgcc ctccgaggcc  
 7501 gtgcagtggc tgtgccacca agcattcctg ctcaagctga ctcgacaccg tgtcacctac  
 7561 gtgccactcc tgggtcact caggacaggc aagtgtgggt ggaggccagt gcggg

D:\Vector NTI\pAKI28.4.gb

FIG. 13D



**FIG. 14A**

LOCUS pAKI28.7 7797 bp dsDNA Circular  
DEFINITION Human telomerase clone with alternative C-terminus

1 tcgacctgca ggcattgcaag cttggcactg gccgtcgttt tacaacgtcg tgactgggaa  
61 aaccctggcg ttacccaact taatcgctt gcagcacatc cccctttcgc cagctggcgt  
121 aatagcgaag aggcccgac cgatcgccct tcccaacagt tgcgcagcct gaatggcgaa  
181 tggcgccctga tgcgggtattt tctccttacg catctgtgag gtatttcaca ccgcataaat  
241 tccctgtttt ggcggatgag agaagatttt cagcctgata cagattaaat cagaacgcag  
301 aagcgggtctg ataaaacaga atttgcctgg cgccagtagc gcggtggtcc cacctgaccc  
361 catgccgaac tcagaagtga aacgccgtag cgccgatggt agtgtggggg ctcccatgc  
421 gagagtaggg aactgccagg catcaaataa aacgaaaggc tcagtcgaaa gactgggcct  
481 ttcgttttat ctgttggttg tcggtgaacg ctctcctgag taggacaaat ccgccgggag

**FIG. 14B**

541 cggattttgaa cggttgcgaag caacggcccg gaggggtggcg ggcaggacgc ccgccataaa  
601 ctgccaggca tcaaattaag cagaaggcca tcctgacgga tggccttttt gcgtttctac  
661 aaactcttcc tgctcgatcata tctacaagcc atccccccac agatacggta aactagcctc  
721 gttttttgcat caggaaagca gggaatttat ggtgactctt cagtacaatc tgctctgatg  
781 ccgcatagtt aagccagccc cgacaccgcg caacaccgcg tgaccgccc tgacgggctt  
841 gtctgctccc ggcattccgct tacagacaag ctgtgaccgt ctccgggagc tgcatgtgtc  
901 agagggtttt accgtcatca ccgaaacgcg cgagacgaaa gggcctcggtg atacgcctat  
961 ttttataggt taatgtcatg ataataatgg tttcttagac gtgaggttct gtacccgaca  
1021 ccatcgaatg gtgcaaaacc tttcgcggtg tggcatgata gcgcccggaa gagagtcaat  
1081 tcagggtgggt gaatgtgaaa ccagtaacgt tatacgtatg cgcagagtat gccggtgtct  
1141 cttatcagac cgtttcccgc gtggtgaacc aggccagcca cgtttctgcg aaaacgcggg  
1201 aaaaagtggg agcggcgatg gcggagctga attacattcc caaccgcgtg gcacaacaac  
1261 tggcgggcaa acagtgcgtt ctgattggcg ttgccacctc cagtctggcc ctgcacgcgc  
1321 cgtcgcaaat tgtcgcggcg attaaatctc gcgccgatca actgggtgcc agcgtgggtg  
1381 tgctgatggt agaacgaagc ggcgtcgaag cctgtaaagc ggcggtgcac aatcttctcg  
1441 cgcaacgcgt cagtgggctg atcattaaat atccgctgga tgaccaggat gccattgctg  
1501 tggaagctgc ctgcactaat gttccggcgt tatttcttga tgtctctgac cagacaccca  
1561 tcaacagtat tattttctcc catgaagacg gtacgcgact gggcgtggag catctggtcg  
1621 cattgggtca ccagcaaatc gcgctgttag cgggcccatt aagtctctgc tcggcgcgctc  
1681 tgcgtctggc tggctggcat aaatatctca ctgcgaatca aattcagccg atagcggaaac  
1741 gggaaggcga ctggagtgc atgtccgggt tccaacaaac catgcaaatg ctgaatgagg  
1801 gcatcggttc cactgcgatg ctgggtgcca acgatcagat ggcgctgggc gcaatgcgcg  
1861 ccattaccga gtccgggctg cgcgttgggt cggatatctc ggtagtggga tacgacgata  
1921 ccgaagacag ctcatgttat atcccgccgt taaccaccat caaacaggat tttcgcctgc  
1981 tggggcgaac cagcgtggac cgttctctgc aactctctca gggccaggcg gtgaaggcca  
2041 atcagctggt gccgctctca ctgggtgaaa gaaaaaccac cctggcgccc aatacgcaaa  
2101 ccgctctctc ccgcgcgttg gcgattcaat taatgcagct ggcacgacag gtttcccgac  
2161 tggaaagcgg gcagtgagcg caacgcaatt aatgtaagt agctcactca ttaggcaccc  
2221 caggctttac actttatgct tccgacctgc aagaacctca cgtcaggtgg cacttttcgg  
2281 ggaaatgtgc gcggaacccc tatttgttta ttttctaaa tacattcaaa tatgtatccg  
2341 ctcatgagac aataaccctg ataaatgctt caataatatt gaaaaaggaa gagtatgagt  
2401 attcaacatt tccgtgtcgc ccttatcccc ttttttgcg ctttttgcc tctgttttt  
2461 gctcaccag aaacgctggg gaaagtaaaa gatgctgaag atcagttggg tgcacgagtg  
2521 ggttacatcg agaactggat ctcaacagcg gtaagatcct tgagagtttt cgccccgaag  
2581 aacgttttcc aatgatgagc actttttaaag ttctgctatg tggcgcggtg tttatccgta  
2641 ttgacgcggc gcaagagcaa ctcggtcgcc gcatacacta ttctcagaat gacttgggtg  
2701 agtactcacc agtcacagaa aagcatctta cggatggcat gacagtaaga gaattatgca  
2761 gtgctgccat aaccatgagt gataacactg cggccaactt acttctgaca acgatcggag  
2821 gaccgaagga gctaaccgct tttttgcaca acatggggga tcatgtaact cgccttgatc  
2881 gttgggaacc ggagctgaat gaagccatac caaacgacga gcgtgacacc acgatgcctg  
2941 tagcaatggc aacaacgttg cgcaaactat taactggcga actacttact ctagcttccc  
3001 ggcaacaatt aatagactgg atggaggcgg ataaagtgtc aggaccactt ctgcgctcgg  
3061 cccttccggc tggctgggtt attgctgata aatctggagc cgggtgagcgt ggggtctcgg  
3121 gtatcattgc agcactgggg ccagatggta agcctcccg tatcgtagt atctacacga  
3181 cggggagtca ggcaactatg gatgaacgaa atagacagat cgtgagata ggtgcctcac  
3241 tgattaagca ttggtactg tcagaccaag tttactcata tatactttag attgatttaa  
3301 aacttcattt ttaattttaa aggatctagg tgaagatcct ttttgataat ctcatgacca  
3361 aaatccctta acgtgagttt tctgtccact gagcgtcaga ccccgtagaa aagatcaaag  
3421 gatcttcttg agatcccttt tttctgcgcg taatctgctg cttgcaaaaca aaaaaaccac  
3481 cgctaccagc ggtggtttgt ttgcccgatc aagagctacc aactcttttt cogaaggtaa  
3541 ctggcttcag cagagcgcag ataccaaata ctgtccttct agtgtagccg tagttaggcc  
3601 accacttcaa gaactctgta gcaccgccta catacctcgc tctgctaate ctgttaccag  
3661 tggctgctgc cagtggcgat aagtcgtgtc ttaccgggtt ggactcaaga cgatagttac  
3721 cggataaggc gcagcggctg ggctgaacgg ggggttcgtg cacacagccc agcttggagc  
3781 gaacgacctc caccgaactg agatacctac agcgtgagca ttgagaaagc gccacgcttc  
3841 ccgaaggag aaaggcggac aggtatccgg taagcggcag ggtcgggaaca ggagagcgca  
3901 cgagggagct tccaggggga aacgcctggt atctttatag tctgtcggg tttcgcacc

FIG. 14C

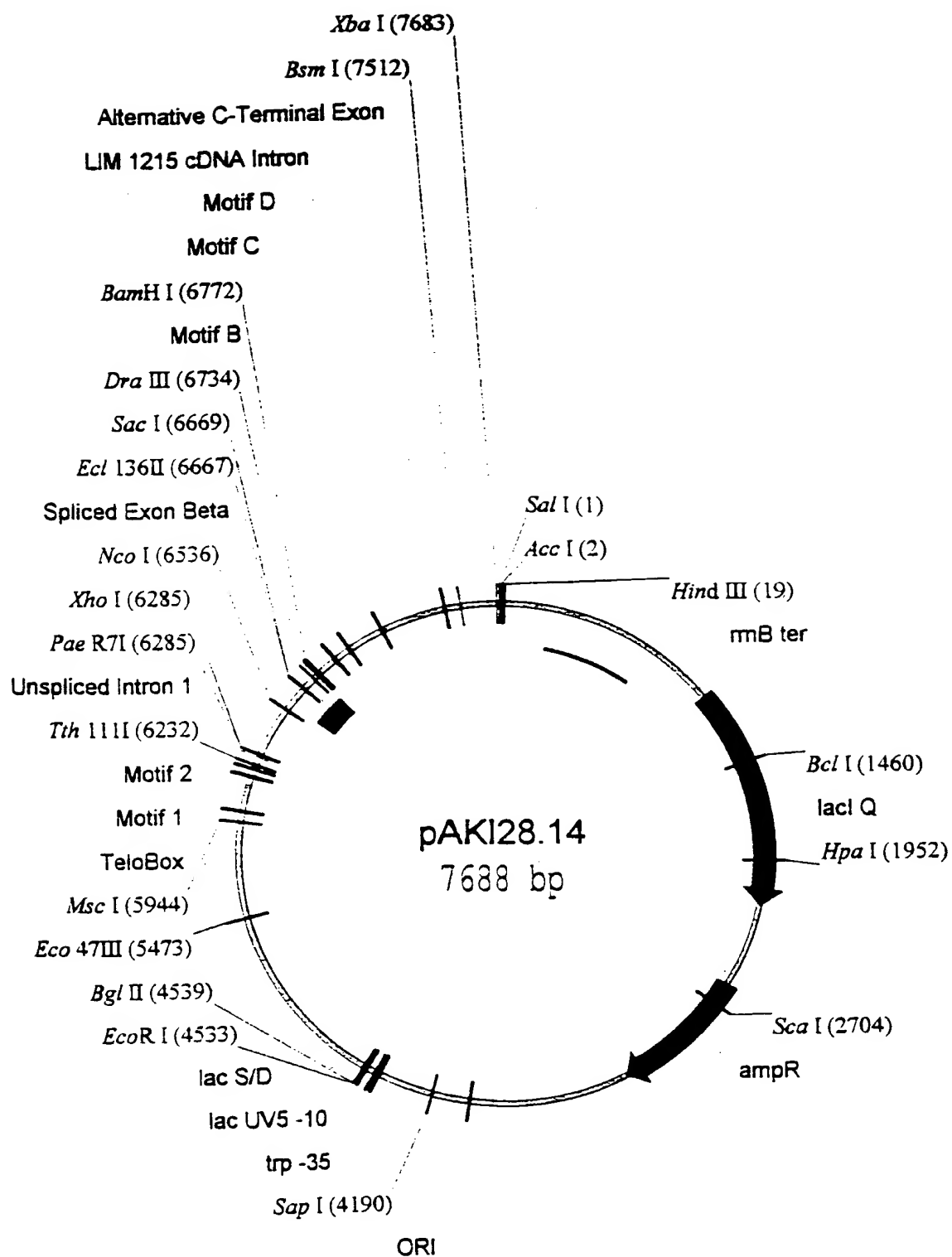
3961 tctgacttga gcgctgattt ttgtgatgct cgtcaggggg gcggagccta tggaaaaacg  
4021 ccagcaacgc ggccttttta cggttccctg ccttttgetg gccttttget cactgttctt  
4081 ttccctgcgtt atcccttgat tctgtggata accgtattac cgcctttgag tgagctgata  
4141 ccgctcgccg cagccgaacg accgagcgca gcgagtcagt gagcgaaggaa gcggaagagc  
4201 gcccataacg caaacgcctt ctcocccgcg gttggccgat tcattaatgc agaattaatt  
4261 ctcatgtttg acagcttata atcgactgca cgggtgcacca atgcttctgg cgtcagggcag  
4321 ccacgggaag ctgtgggtatg gctgtgcagg tctgaaatca ctgcataatt cgtgtcgctc  
4381 aaggcgcaact cccgttctgg ataattgttt ttgcgccgac atcataacgg ttctggcaaa  
4441 tattctgaaa tgagctgttg acaattaatc atcggctcgt ataattgttg gaattgtgag  
4501 cgataacaa ttccacacag gaaacagcga tgaattcaga tctcaccatg aaggagctgg  
4561 tggcccgagt gctgcagagg ctgtgcgagc gcggcgcgaa gaacgtgctg gccttcggct  
4621 tcgctgtgct ggacggggcc cgcgggggccc ccccgaggc cttcaccacc agcgtgcgca  
4681 gctacctgcc caacacgggtg accgacgcac tgcgggggag cggggcggtg gggctgctgc  
4741 tgcgcccgct gggcgacgac gtgctggttc acctgctggc acgtgcgctg ccttttgtgc  
4801 tgggtggctcc cagctgcgccc taccagggtg gcggggccgc gctgtaccag ctccggcgctg  
4861 ccaactcaggc ccggcccccgc ccacacgcta gtggaccccg aaggcgtctg ggatgcgaac  
4921 gggcctggaa ccatagcgtc agggagggcg ggggtccccc gggcctgcca gcccgggtg  
4981 cgaggaggcg cgggggcagt gccagccgaa gtctgccgtt gcccagagg cccaggcgctg  
5041 gcgctgcccc tgagccggag cggacgcccg ttgggcaggg gtccctgggg caccggggca  
5101 ggacgcgtgg accgagtgc cgtgggttct gtgtggtgtc acctgccaga cccgcggaag  
5161 aagccacctc tttggagggt gcgctctctg gcacgcgcca ctcaccacca tccgtgggccc  
5221 gccagcacca cgcggggccc ccatccacat cgcggccacc acgtccctgg gacacgcctt  
5281 gtcccccgggt gtacgcccag accaagcact tctctactc ctcaggcgac aaggagcagc  
5341 tgccggccctc cttctactc agctctctga ggcagccct gactggcgct cggaggctcg  
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5461 gcctgccccg gcgctactgg caaatgcggc cctgtttct ggagctgctt gggaaccacg  
5521 cgcagtgccc ctacgggggt ctcctcaaga cgcactgccc gctgcgagct gcggtcacc  
5581 cagcagccgg tgtctgtgccc cgggagaagc cccagggtc tgtggcgccc cccgaggagg  
5641 aggacacaga ccccgctgc ctgggtgcagc tgcctcgcca gcacagcagc ccttgccagg  
5701 tgtacggctt cgtgcggggc tgcctgcgccc ggcgtgggtg cccaggccctc tggggctcca  
5761 ggcacaacga acgcccgttc ctcagggaaca ccaagaagtt catctccctg gggaagcatg  
5821 ccaagctctc gctgcaggag ctgacgtgga agatgagcgt gcgggactgc gcttggctgc  
5881 gcaggagccc aggggttggc tgtgttccgg ccgcagagca ccgtctgcgt gaggagatcc  
5941 tggccaagtt cctgcactgg ctgactgagtg tgtacgtcgt cgagctgctc aggtctttct  
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6061 ggagcaagtt gcaaagcat ggaatcagac agcacttgaa gaggtgtag ctgcccggagc  
6121 tgcgggaagc agaggtcagg cagcatcggg aagccaggcc cgccttctg acgtccagac  
6181 tccgcttcat ccccaagcct gacgggtgccc ggccgattgt gaacatggac tacgtcgtgg  
6241 gagccagaac gttccgcaga gaaaagaggg ccgagcgtct caccctgagg gtgaaggcac  
6301 tgttcagcgt gctcaactac gacgggggccc ggcggcccg cctcctgggc gcctctgtgc  
6361 tgggcctgga cgatatccac agggccctggc gcaccttcgt gctgcgtgtg cggggccagg  
6421 acccgccgcc tgagctgtac tttgtcaagg tggatgtgac gggcgcgtag gacaccatcc  
6481 cccaggacag gctcacggag gtcacgcca gcatcatcaa accccagaac acgtactgcg  
6541 tgcgtcggtg tgccgtggtc cagaaggccc cccatgggca cgtccgcaag cgttcaaga  
6601 gccacgtctc taccttgaca gacctccagc cgtacatgcg acagttcgtg gctcacctgc  
6661 aggagaccag cccgctgagg gatgcgtg tcatcgagca gagctcctcc ctgaatgagg  
6721 ccagcagtgg cctcttcgac gtcttctac gcttcatgtg ccaccacgcc gtgcgcatca  
6781 ggggcaagtc ctacgtccag tgccagggga tcccgcaggg ctcacatctc tccacgctgc  
6841 tctgcagcct gtgctacggc gacatggaga acaagctgtt tgcggggatt cggcgggagc  
6901 ggctgctcct gcgtttgggt gatgatttct tgttgggtgac acctcacctc acccacgcga  
6961 aaacttcctc aggacctggt ccgaagtgc ctgagtatgg ctgcgtgggt aacttgcgga  
7021 agacagtggg gaacttcccc gtagaagacg aagccctggg tggcacggct tttgttcaga  
7081 tgccggccca cggcctattc cctgggtg gctgtgct ggatacccg accctggagg  
7141 tgagagcga ctactccagc tatgcccga cctccatcag agccagtctc accttcaacc  
7201 gcggttcaa ggctgggagg aacatgcgtc gcaaactctt tggggctctg cggctgaagt  
7261 gtcacagcct gttctggat ttgcagggtg acagcctcca gacggtgtgc accaactct  
7321 acaagatcct cctgctgcag gcgtacagg ttcacgcatg tgtgctgcag ctccatttc

FIG. 14D



7381	atcagcaagt	ttggaagaac	cccacatttt	tcctgcgcgt	catctctgac	acggcctccc
7441	tctgctactc	catcctgaaa	gccagaacg	cagccgaaga	aaacatttct	gtcgtgactc
7501	ctgcggtgct	tgggtcggga	cagccagaga	tggagccacc	ccgcagaccg	tcgggtgtgg
7561	gcagctttcc	ggtgtctcct	gggaggggag	ttgggctggg	cctgtgactc	ctcagcctct
7621	gttttcccc	agggatgtcg	ctgggggcca	agggcgccgc	cggccctctg	ccctccgagg
7681	ccgtgcagtg	gctgtgccac	caagcattcc	tgtcaagct	gactcgacac	cgtgtcacct
7741	acgtgccact	cctgggggtca	ctcaggacag	gcaagtgtgg	gtggaggcca	gtgcggg

**FIG. 14E**



**FIG. 15A**

LOCUS pAKI28.14 7688 bp dsDNA Circular  
 DEFINITION Human telomerase clone with exon alpha spliced out

```

1  tcgacctgca ggcattgcaag cttggcactg gccgtcgctt tacaacgtcg tgactgggaa
61  aacctctggc ttacctcaact taatcgccct gcagcacatc cccctttcgc cagctggcgt
121 aatagcgaag agggccgcac cgatcgccct tcccaacagt tgcgcagcct gaatggcgaa
181 tggcgccctga tgcgggtattt tctccttacg catctgtgcg gtatttcaca ccgcataaat
241 tccctgtttt ggccggatgag agaagatttt cagcctgata cagattaaat cagaacgcag
301 aagcgggtctg ataaaacaga atttgcctgg cggcagtagc gcgggtggtcc cacctgaccc
361 catgccgaac tcagaagtga aacgccgtag cgccgatggt agtgtggggg ctccccatgc
421 gagagtaggg aactgccagg catcaaataa aacgaaaggc tcagtcgaaa gactgggcct
481 ttcgttttat ctgtgtgttg tcgggtgaacg ctctcctgag taggacaaat ccgcccggag
541 cggatttgaa cgttgcgaag caacggcccg gagggtggcg ggcaggacgc ccgccataaa
601 ctgccaggca tcaaattaag cagaaggcca tccctgacga tggccttttt gcgtttctac
661 aaactcttcc tgtcgtcata tctacaagcc atccccccac agatacggta aactagcctc
721 gtttttgcat caggaaagca gggaatttat ggtgcactct cagtacaatc tgctctgatg
781 ccgcatagtt aagccagccc cgacaccgcg caacaccgcg tgacgcgccc tgacgggctt
841 gtctgtctcc ggcatccgct tacagacaag ctgtgaccgt ctccgggagc tgcatgtgtc
901 agagggtttc accgtcatca ccgaaacgcg cgagacgaaa gggcctcgtg atacgcctat
961 ttttataggt taatgtcatg ataataatgg tttcttagac gtgaggttct gtacccgaca
1021 ccatcgaatg gtgcaaaacc tttcgcggta tggcatgata gcgcccggaa gagagtcaat
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1381 tgcgatgggt agaacgaagc ggcgctgaag cctgtaaaag ggcgggtgac aatcttctcg
1441 cgcaacgcgt cagtgggctg atcattaaat atccgctgga tgaccaggat gccattgctg
1501 tgggaagctgc ctgcactaat gtcccgccgt tattctctga tgtctctgac cagacaccca
1561 tcaacagtat tttttctctc catgaagacg gtacgcgact gggcggtggg catctggtcg
1621 cattgggtca ccagcaaatc gcgctgttag cgggcccatt aagttctgtc tcggcgcgctc
1681 tgcgtctggc tggctggcat aaatatctca ctgcgaatca aattcagccg atagcggaa
1741 gggaaggcga ctggagtgcc atgtccgggt tccaacaaac catgcaaatg ctgaatgagg
1801 gcatcggtcc cactgcgatg ctggttgcca acgatcagat ggcgctgggc gcaatgcgcg
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1981 tggggcaaac cagcgtggac cgtctgtctc aactctctca gggccaggcg gtgaagggca
2041 atcagctgtt gcccgctctc ctggtgaaaa gaaaaaccac cctggcgccc aatacgcaaa
2101 ccgcctctcc ccgcgcgttg gccgatttat taatgcagct ggcacgacag gtttcccgac
2161 tggaaagcgg gcagtgaagc caacgcaatt aatgtaagtt agctcactca ttaggcaccc
2221 caggctttac actttatgct tccgacctgc aagaacctca cgtcagggtg cacttttcgg
2281 ggaaatgtgc gcggaacccc tattgtttta tttttctaaa tacattcaaa tatgtatccg
2341 ctcatgagac aataacccct ataaatgctt caataatatt gaaaaaggaa gagtatgagt
2401 attcaacatt tccgtgtcgc ccttattccc ttttttgagg cattttgcct tccgtttttt
2461 gctcaccag aaacgctggg gaaagtaaaa gatgctgaag atcagttggg tgcacgagtg
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2581 aacgttttcc aatgatgagc acttttaaa gttctgtatg tggcgcggtg ttatcccgta
2641 ttgacgcggg gcaagagcaa ctcggtcgcc gcatacacta ttctcagaat gacttggttg
2701 agtactcacc agtcacagaa aagcatctta cggatggcat gacagtaaga gaattatgca
2761 gtgctgccat aaccatgagt gataacactg cggccaactt acttctgaca acgatcggag
2821 gaccgaagga gctaaccgct tttttgcaca acatggggga caaacgacga gcgtgacacc acgatgcctg
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3001 ggcaacaatt aatagactgg atggaggcgg ataaagtgtc aggaccactt ctgcgctcgg
3061 cccctccggc tggctgggtt attgctgata aatctggagc cggtagcgtg ggggtctcgg
3121 gtatcattgc agcaactggg ccagatggta agccctcccg tatcgtagtt atctacacga
3181 cggggagtcg ggcaactatg gatgaacgaa atagacagat cgctgagata ggtgcctcac
3241 tgattaagca ttggtaactg tcagaccaag tttactcata tatactttag attgatttaa
3301 aacttcattt ttaatttaaa aggatctagg tgaagatcct ttttgataat ctcatgacca

```

FIG. 15B

3361	aaatccctta	acgtgagttt	tctgtccact	gagcgtcaga	ccccgtagaa	aagatcaaag
3421	gatcttcttg	agatcccttt	ttctgcgcg	taatctgctg	cttgcaaaca	aaaaaaccac
3481	cgctaccagc	ggtggtttgt	ttgccggatc	aagagctacc	aactcttttt	ccgaaggtaa
3541	ctggcttcag	cagagcgcag	ataccaaata	ctgtccttct	agtgtagccg	tagttaggcc
3601	accacttcaa	gaactctgta	gcaccgccta	catacctcgc	tctgctaate	ctgttaccag
3661	tggctgctgc	cagtggcgat	aagtcgtgtc	ttaccgggtt	ggactcaaga	cgatagttac
3721	cggataaggc	gcagcggtcg	ggctgaacgg	ggggttcgtg	cacacagccc	agcttggagc
3781	gaacgacctt	caccgaactg	agatacctac	agcgtgagca	ttgagaaagc	gccacgcttc
3841	ccgaaggag	aaaggcggac	aggtatccgg	taagcggcag	ggtcggaaca	ggagagcgca
3901	cgaggagct	tccaggggga	aacgcctggg	atctttatag	tcctgtcggg	tttcgccacc
3961	tctgacttga	gcgtcgatct	ttgtgatgct	cgtcaggggg	gcggagccta	tggaaaaacg
4021	ccagcaacgc	ggccttttta	cggttccttg	ccttttgcgt	gccttttgcgt	cacatgttct
4081	ttcctgcgtt	atccctgat	tctgtggata	accgtattac	cgcttttgag	tgagctgata
4141	ccgtcgcgg	cagccgaacg	accgagcgca	gcgagtcagt	gagcgaggaa	gcggaagagc
4201	gcccatacag	caaaccgcct	ctcccccgcg	gttgcccgat	tcattaatgc	agaattaatt
4261	ctcatgtttg	acagcttate	atcgactgca	cgggtgcacca	atgcttcttg	cgtcaggcag
4321	ccatcggaag	ctgtggtatg	gctgtgcagg	tcgtaaatca	ctgcataatt	cggtgcgctc
4381	aaggcgcact	cccgcttctg	ataatgtttt	ttgcgcgcag	atcataacgg	ttctggcaaa
4441	tattctgaaa	tgagctgttg	acaattaatc	atcggtcgt	ataatgtgtg	gaattgtgag
4501	cggataacaa	tttcacacag	gaaacagcga	tgaattcaga	tctcaccatg	aaggagctgg
4561	tggcccgagt	gctgcagagg	ctgtgcgagc	gcggcgcgaa	gaacgtgctg	gccttcgggt
4621	tcgcgctgct	ggagcggggc	cgcggggggc	cccccgaggc	cttcaccacc	agcgtgcgca
4681	gctacctgcc	caacacggtg	accgacgcac	tcgcggggag	cgggcgctgg	gggtgctgc
4741	tgcgcgcgt	gggcgacgac	gtgctgggtc	acctgctggc	acgctgcgct	ctctttgtgc
4801	tgggtggctc	cagctgcgc	taccaggtgt	gcgggcgcgc	gctgtaccag	ctcggcgctg
4861	ccactcaggc	ccggcccccg	ccacacgcta	gtggaccccc	aaggcgctct	ggatgcgaac
4921	gggcctggaa	ccatagcgct	agggagggcg	gggtccccct	gggcctgcca	gccccgggtg
4981	cgaggaggcg	cgggggcagt	gccagccgaa	gtctgcgctt	gcccagagg	cccaggcgct
5041	gcgctgcccc	tgagccggag	cggacgcgcc	ttgggcaggg	gtcctggggc	caccggggca
5101	ggacgcgtgg	accgagtgc	cgtgggttct	gtgtgggtgt	acctgccaga	cccgcggaag
5161	aagccacctc	tttgaggggg	gcgctctctg	gcacgcgcca	ctcccaccca	tcctgtgggc
5221	gcccagacca	cgcggggccc	ccatccacat	cgcggccacc	acgtccctgg	gacacgcctt
5281	gtcccccggt	gtaccgcgag	accaagcaat	tcctctactc	ctcaggcgac	aaggagcagc
5341	tgccggccct	cttccctact	agctctctga	ggcccagcct	gactggcgct	cggaggctcg
5401	tggagaccat	ctttctgggt	tccaggccct	ggatgccagg	gactccccgc	aggttgcccc
5461	gcctgcccc	gcgctactgg	caaatzcggc	ccctgtttct	ggagctgctt	gggaaccacg
5521	cgcagtgcct	ctacgggggt	ctccctcaaga	cgcactgccc	gctgcgagct	gcggctaccc
5581	cagcagccgg	tgtctgtgct	cgggagaagc	cccagggtct	tgtggcgggc	cccaggaggg
5641	aggacacaga	cccccgctgc	ctggtgcagc	tgctccgcca	gcacagcagc	ccctggcagg
5701	tgtacggctt	cgtgcggggc	tgccctgcgc	ggctgggtgc	cccaggccct	tggggctcca
5761	ggcacaacga	acgcgccttc	ctcagggaaca	ccaagaagtt	catctccctg	gggaagcatg
5821	ccaagctctc	gctgcaggag	ctgacgtgga	agatgagcgt	gcgggactgc	gcttggctgc
5881	gcaggagccc	aggggttggc	tgtgttccgg	ccgcagagca	ccgtctgcgt	gaggagatcc
5941	tggccaagtt	cctgcactgg	ctgagtgtgt	tgtacgtcgt	cagagctgct	aggtccttct
6001	tttatgtcac	ggagaccacg	tttcaaaaga	acaggctctt	tttctacogg	aagagtgtct
6061	ggagcaagtt	gcaaagcatt	ggaatcagac	agcacttgaa	gaggggtgcag	ctgcgggagc
6121	tgtcggaaag	agaggtcagg	cagcatcggg	aagccaggcc	cgcctgtgct	acgtccagac
6181	tcctgttcat	ccccaaagcc	gacgggctgc	ggccgattgt	gaacatggac	tacgtcgtgg
6241	gagccagaac	gttccgcaga	gaaaagaggg	ccgagcgtct	cacctcgagg	gtgaaggcac
6301	tgttcagcgt	gctcaactac	gagcggggcg	ggcgccccgg	cctcctgggc	gcctctgtgc
6361	tgggccttga	cgatatccac	agggccttgg	gcaccttcgt	gctgcgtgtg	cggggcccagg
6421	acccgcgcgc	tgagctgtac	tttgtcaagg	acaggctcac	ggaggctcac	gccagcatca
6481	tcaaacccag	aacacgtact	gcgtgcgtcg	gtatgccgtg	gtccagaagg	ccgcccattg
6541	gcacgtccgc	aaggccttca	agagccacgt	ctctaccttg	acagacctcc	agccgtacat
6601	gcgacagttc	gtggctcacc	tgcaggagac	cagcccgtct	agggatgcgc	tcgtcatcga
6661	gcagagctcc	tccttgaatg	agggcagcag	tggcctcttc	gacgtcttcc	tacgttccat
6721	gtgccaccac	gccgtgcgca	tcaggggcaa	gtcctacgtc	cagtgcagg	ggatcccgc

FIG. 15C

6781	gggctccatc	ctctccacgc	tgctctgcag	cctgtgctac	ggcgacatgg	agaacaagct
6841	gtttgcgggg	attcggcggg	acgggctgct	cctgcgtttg	gtggatgatt	tcttggtggt
6901	gacacctcac	ctcaccacg	cgaaaacctt	cctcaggacc	ctgggtccgag	gtgtccctga
6961	gtatggctgc	gtggtgaact	tgcggaagac	agtgggtgaac	ttccctgtag	aagacgaggc
7021	cctgggtggc	acggcttttg	ttcagatgcc	ggcccacggc	ctattcccct	ggtgcggcct
7081	getgetggat	acccggaccc	tggaggtgca	gagcgactac	tccagctatg	cccggacctc
7141	catcagagcc	agtctcacct	tcaaccgcgg	cttcaaggct	gggaggaaca	tgcgtcgcaa
7201	actctttggg	gtcttgcggc	tgaagtgtca	cagcctgttt	ctggatttgc	aggtgaacag
7261	cctccagacg	gtgtgcacca	acatctacaa	gatcctcctg	ctgcaggcgt	acaggtttca
7321	cgcatgtgtg	ctgcagctcc	catttcatca	gcaagtgttg	aagaacccca	catttttccct
7381	gcgcgtcatc	tctgacacgg	cctccctctg	ctactccatc	ctgaaagcca	agaacgcagg
7441	gatgtcgctg	ggggccaagg	gcgccgccgg	ccctctgccc	tccgaggccg	tgcagtggct
7501	gtgccaccaa	gcattcctgc	tcaagctgac	tcgacaccgt	gtcacctacg	tgccactcct
7561	ggggtcactc	aggacagccc	agacgcagct	gagtcggaag	ctcccgggga	cgacgctgac
7621	tgccctggag	gccgcagcca	acccggcact	gccctcagac	ttcaagacca	tcctggactg
7681	atctagag					

**FIG. 15D**